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Upper Ocmulgee River Basin Water Quality Management Plan

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Atlanta, GA

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National Technical Information Service
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United States
Environmental Protection
Agency

Region 4
345 Courtland Street, NE
Atlanta, GA 30308

EPA 904/9-80-049
April 1980

EPA

Environmental Impact Statement

Draft

Upper Ocmulgee River Basin Water Quality Management Plan

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INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA 22161

DRAFT

ENVIRONMENTAL IMPACT STATEMENT

UPPER OCMULGEE RIVER BASIN WATER QUALITY MANAGEMENT PLAN

Prepared by

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region IV
345 Courtland Street
Atlanta, Georgia 30308

APRIL 1980

Approved by:
John A. Little, Deputy
for Regional Administrator
Environmental Protection Agency
Region IV

ENVIRONMENTAL IMPACT STATEMENT: UPPER OCMULGEE RIVER BASIN WATER QUALITY MANAGEMENT PLAN

ABSTRACT

The Upper Ocmulgee River Basin, covering 1400 square miles of diverse land use, is undergoing rapid change. These changes are most evident in the Yellow River Sub-basin, which is experiencing rapid suburban growth. The Environmental Protection Agency has expressed concern that approval of the First Edition, Upper Ocmulgee River Basin Water Quality Management Plan might accelerate this growth, leading to further degradation of water quality. Any further decrease in Yellow River water quality will adversely affect the water quality in Lake Jackson which has already experienced problems.

Six scenarios were developed and analyzed to gauge the sensitivity of water quality to various populations and land uses. However, under each of the scenarios, Lake Jackson's water quality would continue to deteriorate. Therefore, it was necessary to develop a management strategy to control enrichment of Lake Jackson. This control can be achieved most economically by limiting phosphorus loading.

Seven alternatives were developed. Most of them involved the modification of point sources which were the major contributors of phosphorus. Of these, the least costly, most environmentally sound in a Basin-wide comparison was found to be land application of pretreated wastewater. This alternative was found also to result in the best future water quality in the Lake. The strategy selected to implement this alternative included the requirement of a case-by-case detailed investigation of land application for all expansions of existing facilities and presently approved facilities and for all future facilities. The strategy then included the selection of this disposal method where economically competitive and environmentally sound.

The EIS requires that the First Edition, Upper Ocmulgee River Basin Water Quality Management Plan be updated consistent with the EIS so that the effluent limits it contains are those necessary to meet applicable water quality standards in the Basin. Also, the overall water quality management strategy for the Basin must include the elements of the selected strategy regarding point and nonpoint controls developed in this EIS. Once these are accomplished, then the First Edition, Upper Ocmulgee River Basin Water Quality Management Plan can be approved.

SUMMARY SHEET FOR ENVIRONMENTAL IMPACT STATEMENT

Upper Ocmulgee River Basin
303(e) Water Quality Management Plan

Draft (X)
Final ( )

Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30308

1. Type of Action: Administrative Action (X)
   Legislative Action ( )

2. Brief Description of Proposed Action:

This Environmental Impact Statement has been prepared in response to the action of approval of the First Edition, Upper Ocmulgee River Basin 303(e) Water Quality Management Plan. The recommended water quality management strategy for point sources involves the utilization of land application for all new expansions of existing or approved facilities and all future facilities in the Basin whenever economically competitive and environmentally sound. The strategy includes reduction in nonpoint source loadings through strict enforcement of existing laws and ordinances as well as implementation of the recommendations of the Atlanta Region and Statewide 208 Water Quality Management Plans. In addition, the strategy requires a thorough evaluation of the use of on-lot disposal systems to reduce loading to surface waters.

Evaluation of the recommended point source strategy included a case-by-case examination of all 201 Facility Plans in the Basin. The strategy does not recommend revising any facilities approved to date. It assumes maximum use of these facilities and builds on them using conservative design parameters. The strategy assumes that case-by-case decisions will be made by the Environmental Protection Agency, the Georgia Environmental Protection Division, the individual 201 applicants, and other appropriate agencies. Within this decision-making process, land application alternatives in the Basin will be rigorously investigated using the latest federal and state guidelines and implemented wherever they are found to be economically competitive and environmentally acceptable.

3. Summary of Major Environmental Impacts

Implementation of the recommended strategy would cause the water quality of Lake Jackson to be greatly improved over existing conditions and substantially improved over conditions expected to occur even with implementation of currently required effluent limitations for surface water discharges. Combined with strict enforcement of existing laws and ordinances to achieve an approximate ten percent reduction in projected nonpoint loadings, the strategy would likely improve the overall quality of Lake Jackson to resemble that of Lake Allatoona, a large impoundment on the Etowah River northwest of Atlanta. Further, the recommended strategy would bring about substantial improvement in stream water quality.

Other impacts of the point source strategy (land application) include possible localized atmospheric effects; impacts to on-site terrestrial communities and soils; lowering of base stream flows during drought conditions; and possible impacts to groundwaters or adjacent surface waters. These adverse impacts may be mitigated by proper site selection and management procedures. In addition, the land application alternative may require relocation of residents at the application sites; may result in localized changes in land values; and may cause loss of some tax revenue as a result of government purchase of land.

Impacts of the nonpoint source portion of the strategy include additional costs associated with expansion of planning and enforcement activities by local jurisdictions; localized changes in land use patterns; and additional development costs to implement best management practices (BMP's) for nonpoint source control.

4. Summary of Alternatives Considered

A number of alternatives to reduce future point source loading to Lake Jackson were considered. These included various means of wastewater treatment, banning the sale of detergents and cleaning compounds containing phosphorus, diverting wastewater to the Chattahoochee River, discharging wastewater below Lake Jackson, and land application of treated wastewaters.

Two levels of nonpoint source control were considered:

- Continuation of the present state of enforcement of existing laws and ordinances, and
- Strict enforcement of these existing mechanisms and implementation of the recommendations of the Atlanta and Statewide 208 plans to achieve an approximate ten percent reduction in nonpoint phosphorus loadings.

These alternatives were applied to three of six previously developed Year 2000 planning scenarios for the Upper Ocmulgee Basin. The three scenarios incorporated, respectively, elements of the Atlanta Region Areawide Wastewater Management Plan 1976, local 201 Facility Plans completed to date, and an assumption that no further federal 201 grants would be made in the Basin.

5. Comments on the Draft Statement have been requested from the following:

Federal Agencies

Bureau of Outdoor Recreation
U.S. Coast Guard
Corps of Engineers
Council on Environmental Quality
Department of Commerce
Department of Health, Education and Welfare
Department of the Interior
Department of Transportation
Department of Housing and Urban Development
Economic Development Administration
Federal Highway Administration
Fisheries and Wildlife Service
Food and Drug Administration
Forest Service
Geological Survey
National Park Service
Soil Conservation Service
Federal Energy Administration
Federal Power Commission

Members of Congress

Honorable Herman E. Talmadge	U.S. Senate
Honorable Sam Nunn	U.S. Senate
Elliott Levitas	U.S. House of Representatives
Newt Gingrich	U.S. House of Representatives
Edgar Jenkins	U.S. House of Representatives
Douglas Barnard, Jr.	U.S. House of Representatives

State

George Busbee, Governor
Georgia Department of Natural Resources
Georgia Department of Agriculture
Georgia Department of Archives and History
Georgia Office of Planning and Budget
Georgia Forestry Commission
Georgia Department of Transportation
Georgia Department of Community Affairs

Local

The Atlanta Regional Commission
Atlanta Water Resources Commission
DeKalb County Commission
Gwinnett County Commission
Newton County Commission
Rockdale County Commission
Walton County Commission
Henry County Commission
Fulton County Commission
Clayton County Commission
Butts County Commission
McIntosh Trail Area Planning and Development Commission
Upper Ocmulgee River Soil and Water Conservation District

Interested Groups

The Georgia Conservancy
Lake Jackson Civic Association
Audubon Society
Sierra Club
Gwinnett County League of Women Voters
Metro Atlanta Home Builders Association
DeKalb Developers Association

6. Date made available to OER and the Public

The Draft Statement was made available to the Office of Environmental Review and the Public in MAY 2 1980.

DRAFT

ENVIRONMENTAL IMPACT STATEMENT

UPPER OCMULGEE RIVER BASIN

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I. BACKGROUND

CHAPTER I

BACKGROUND

This chapter provides the background against which the environmental impact statement (EIS) was authorized, including the legal basis; the historical background of the project; the scope and objectives of the project; and a summary of the present water quality in the Upper Ocmulgee River Basin.

A. IDENTIFICATION

The Upper Ocmulgee River Basin, one of fifteen basins designated by the State of Georgia for basin-wide studies, is located in the Piedmont region of Georgia, within the eastern portions of the Atlanta area. It includes the drainage areas of the South, Yellow and Alcovy rivers, as well as minor tributaries of Lake Jackson, a man-made impoundment. The total drainage area is approximately 1400 square miles. (See Figure I-1).

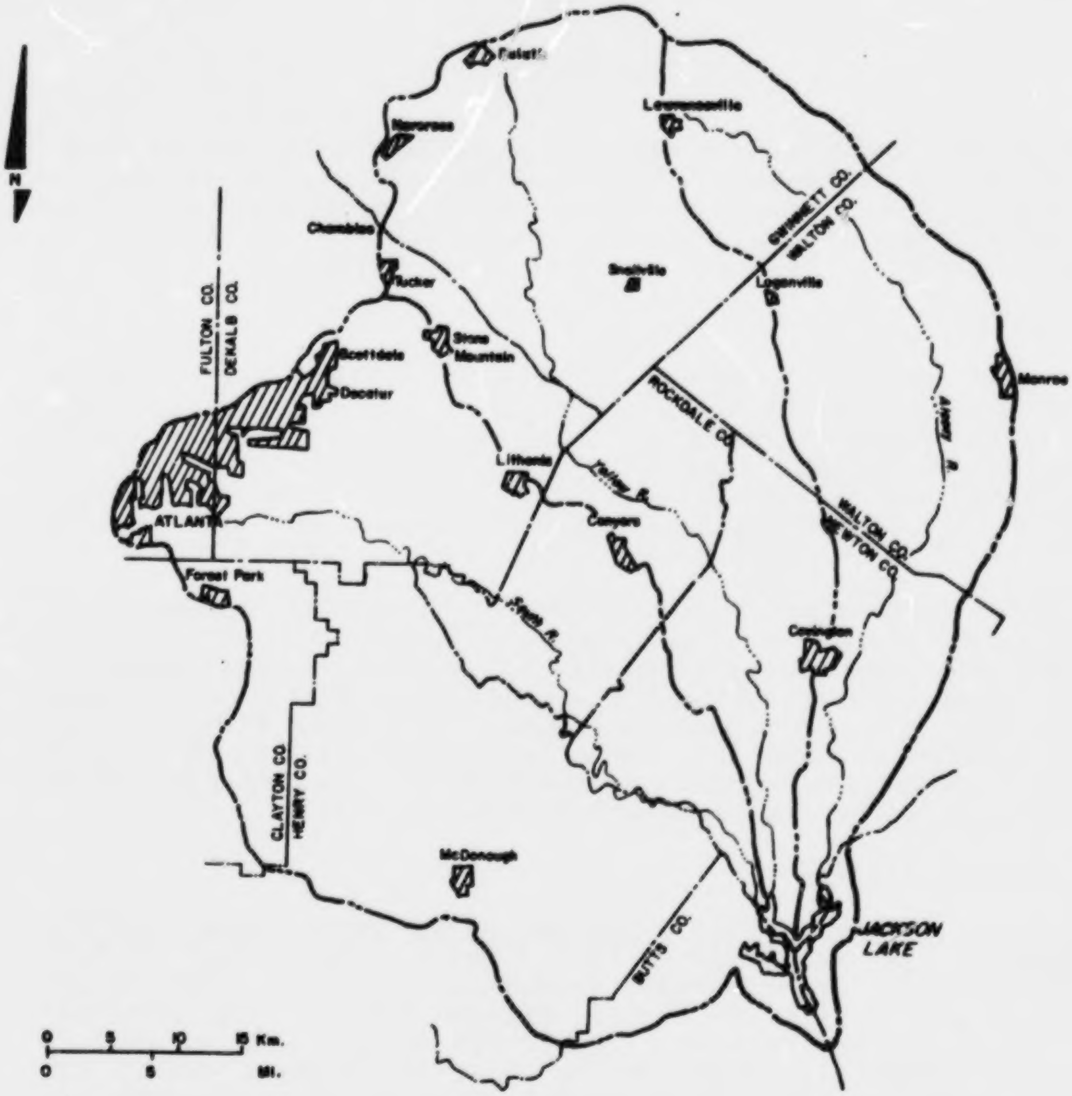
The water quality of the Basin varies, generally in inverse ratio to the degree of urbanization. The South River, running through the highly-populated Atlanta section, demonstrates the worst water quality, while the Alcovy River, draining a largely rural area, shows the best quality. The Yellow River Sub-basin, located between the South and Alcovy rivers, is now an area of considerable suburban development, causing concern as to maintenance of its presently good water quality.

B. PROJECT HISTORY

The First Edition, Upper Ocmulgee River Basin Water Quality Management Plan was prepared by the Georgia Department of Natural Resources, Environmental Protection Division (EPD) in accordance with Public Law 92-500, Section 303(e). The principal concern of the Environmental Protection Agency (EPA) is that approval of that plan might bring about development within the Yellow River Sub-basin to an extent which would cause deterioration of water quality in the Yellow River and its tributaries.

EPA's review comments on the First Edition, Upper Ocmulgee River Basin Water Quality Management Plan were forwarded to EPD in January, 1975. Their comments, together with requests from several parties concerned with the impact of development on water quality in the Basin, led to a decision by EPA Region IV to prepare an EIS. The Agency's Notice of Intent to prepare an EIS in December, 1975, identified the Yellow River Sub-basin as a focus of alternative wastewater management systems, and indicated the importance of investigating secondary effects of development. It also indicated a realization that nonpoint pollutant loads as well as point source pollution loads, which result from increasing urbanization in the Yellow River

FIGURE I-1


N
Duluth
Norcross
Lawrenceville
Chamblee
Tucker
Snellville
Loganville
GWINNETT CO.
WALTON CO.
FULTON CO.
DEKALB CO.
Stone Mountain
Scottdale
Decatur
Monroe
ROCKDALE CO.
Alcovy R.
Lithonia
Yellow R.
ATLANTA
Conyers
WALTON CO.
NEWTON CO.
Forest Park
South R.
Covington
CLAYTON CO.
HENRY CO.
McDonough
BUTTS CO.
JACKSON LAKE
0 5 10 15 Km.
0 5 Mi.

UPPER OCMULGEE RIVER BASIN

Sub-basin, might pose a significant threat to the maintenance of water quality standards.

C. PROJECT OBJECTIVES

The basic objective of this environmental impact statement is to review the Upper Ocmulgee River Basin Water Quality Management Plan, with emphasis on nonpoint source loading and management alternatives, in order to develop a management strategy which will ensure the maintenance of water quality standards. Other objectives are as follows:

1. Define a water quality management program which will ensure the attainment of Georgia water quality standards.
2. Evaluate state and local policies and programs including those for the management of land and other natural resources which may have a beneficial effect on the maintenance of water quality.
3. Identify institutional arrangements and programs to implement coordinated decisions designed to achieve water quality goals and standards.
4. Devise, evaluate and test applicable point and nonpoint source controls, both structural and nonstructural, toward the achievement of water quality standards.
5. Determine the effects of point and nonpoint sources resulting from projected population increases for the Yellow River Sub-basin.
6. Determine the effects of projected loading from each of the sub-basins to Lake Jackson.
7. Develop an implementable management strategy for the regulation and control of point and nonpoint sources of pollution, and where possible, enhance water quality.
8. In pursuing the above objectives, provide for a broad-based and geographically comprehensive public participation process aimed at informing and involving the public in the water quality management program.

D. PROJECT SCOPE/STUDY AREA

The 1400-square mile Upper Ocmulgee River Basin includes major portions of Gwinnett, Walton, DeKalb, Rockdale, Newton and Henry counties, and smaller portions of Butts, Jasper, Clayton and Fulton counties. Figure I-1 identifies the Basin, with major sub-basins, major municipalities and county boundaries.

E. PROJECT BACKGROUND

Pollution of the South River is not new, having been documented as early as 1890. However, by 1970, EPD assessed it and many of its tributaries as "polluted" or "grossly polluted". At the same time, water quality of the Yellow River was relatively good, as was that of the Alcovy River. Concurrent studies found Lake Jackson to be undergoing accelerated eutrophication because of nutrient loads from the South River, and to a lesser extent from the Yellow River. Algae blooms were reported on Lake Jackson in 1970 and 1975.

The water quality standards of the State of Georgia are incorporated in the Rules of the Georgia Water Quality Control Board, Chapter 730-3 as amended, providing for enhancement of water quality and prevention of pollution. The rules provide water use classifications, with most stringent criteria for Drinking Water, ranging to the least stringent for the Urban streams classification.

The main source of water supply for the Atlanta area is the Chattahoochee River, including Lake Lanier. Little Cotton Indian Creek, Walnut Creek, Yellow River, and Alcovy River are also, however, used for water supply.

There are a total of 65 wastewater treatment facilities in the Basin which treat domestic sewage. Of these, 22 are privately or institutionally owned, and have a total design capacity of .69 million gallons per day (MGD). Twenty of these have received NPDES permits. The 43 municipal discharges have all received NPDES permits, and have a total design capacity of 84.849 MGD.

Because of readily available municipal sewage systems, there are no major industrial discharges in the Basin. The few minor discharges result largely from gravel-crushing operations. All of the industrial discharges have received NPDES permits.

Three counties -- Gwinnett, DeKalb and Rockdale -- have accounted for nearly one-half the growth in the Atlanta metropolitan area since 1970. The year 2000 population is projected at two to four times the current level for the Yellow River Sub-basin. Employment opportunities are substantial in the area, and are expected to double by the end of this study period. This element and a growing network of highways providing easy access to the Atlanta core are the main factors leading to rapid development. This development will in turn lead to increased loadings to Lake Jackson, and will make maintenance of water quality standards increasingly difficult.

II. ENVIRONMENT

CHAPTER II

ENVIRONMENT

This chapter summarizes the existing environment, both natural and man-made, as well as future land uses and population projections.

A. ATMOSPHERE

The climate of the project area is temperate, with the dominant air masses being moist, warm and unstable. Annual precipitation, mostly in the form of rain, is approximately 50 inches. Prevailing winds, generally from the northwest, average about nine miles per hour.

Air quality is relatively good, rarely exceeding state and federal pollution standards, with the exception of excessive ozone in DeKalb County. Neither noise nor odor presents substantial problems at the present.

B. LAND RESOURCES

The Upper Ocmulgee River Basin lies entirely within the Piedmont province, which is generally rolling land. A few mountains, granitic outliers of the Blue Ridge chain, are found here. The Basin is drained by a dendritic stream system which ultimately empties into the Atlantic Ocean. The Yellow River forms a sub-basin which is urban in character on its western and northern fringes, nearest Atlanta.

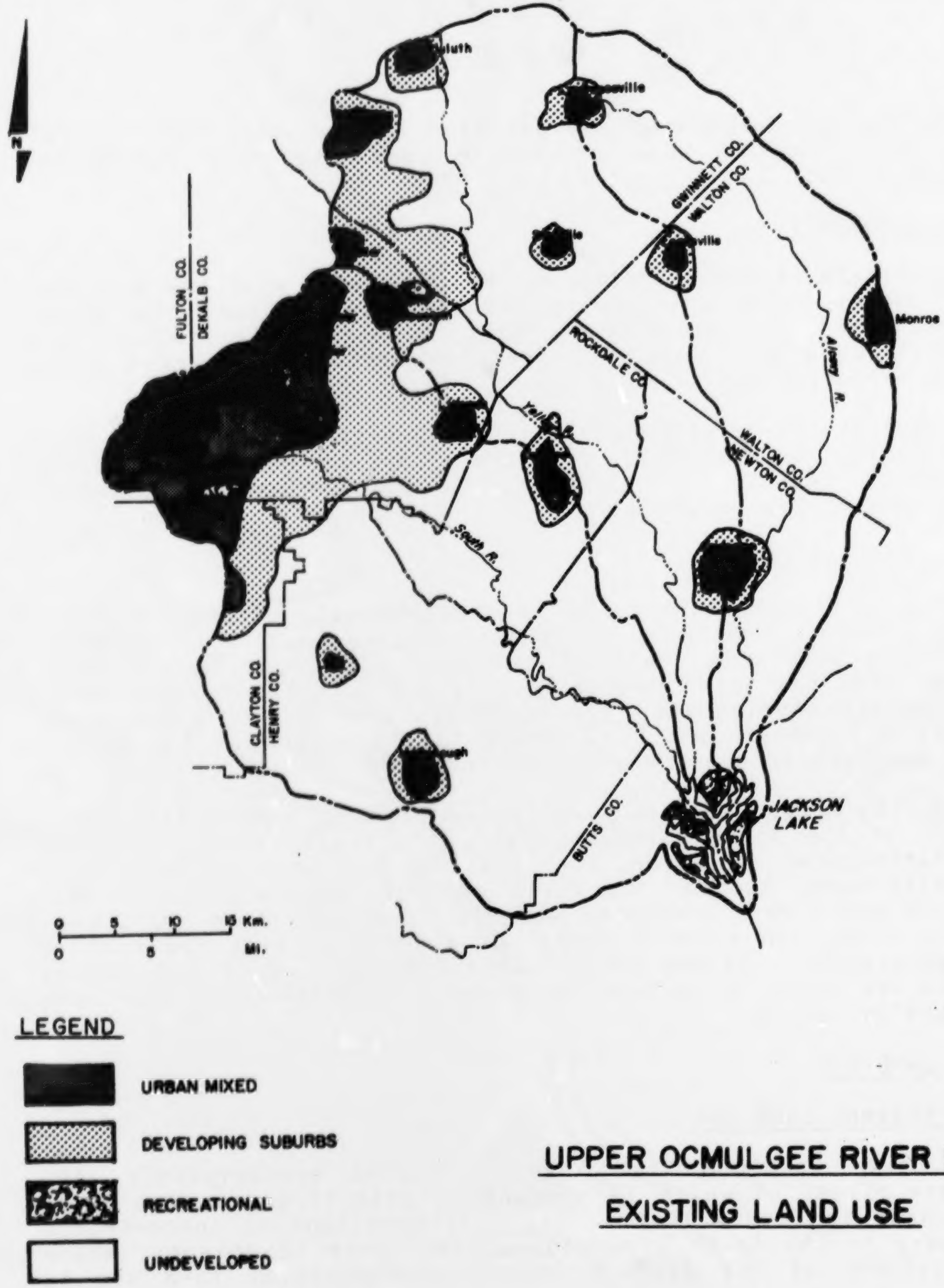
Since the Upper Ocmulgee River Basin lies far within the boundaries of the North American Plate, it is very rarely affected by earthquakes. However, rock breakage is common on exfoliated granite domes such as the north side of Stone Mountain. Most of the soils were formed by material weathered from the underlying rock, and a thick mantle of decomposed rock and soil is often present. In the Yellow River Sub-basin, dark red, clayey soils are found in certain locations. Alluvial soils there are generally acidic.

C. LAND USE

1. Present Land Use

The Upper Ocmulgee River Basin contains approximately 1400 square miles, of which 19 percent is classified as developed, as shown in Figure II-1. This developed land is concentrated largely in the South River Sub-basin, close to Atlanta, where 71 percent of the Basin's industrial/commercial land use is

FIGURE II-1


N
Monroe
GWINNETT CO.
WALTON CO.
ROCKDALE CO.
WALTON CO.
NEWTON CO.
FULTON CO.
DEKALB CO.
CLAYTON CO.
HENRY CO.
BUTTS CO.
South R.
Alcovy R.
JACKSON LAKE
0 5 10 15 Km.
0 5 Mi.
LEGEND
■ URBAN MIXED
▨ DEVELOPING SUBURBS
▩ RECREATIONAL
☐ UNDEVELOPED

UPPER OCMULGEE RIVER BASIN

EXISTING LAND USE

also located. The highest concentration of development is in DeKalb County. The next highest concentration of industrial/ commercial development is in the upper reaches of the Yellow River Sub-basin, particularly in the northwest section.

Current land use in the Upper Ocmulgee River Basin is classified in Table II-1 as follows: urban or built-up; agricultural; forest; water; wetland; and exposed or barren.

Of the urban land, residential use composes 71 percent; commercial, 11 percent; and industrial, about 2 percent. The remainder is used for transportation, communications and utilities; industrial and commercial complexes; mixed; and other, such as golf courses, zoos, and cemeteries.

The largest land use category in the Upper Ocmulgee River Basin is forest land (deciduous, evergreen and mixed), comprising 53 percent (472,444 acres) of the land.

Agricultural land accounts for approximately 25 percent of the land in the Upper Ocmulgee River Basin. Of this category, cropland and pasture use is by far the largest -- 99 percent of the agricultural land, and 24 percent of the total land. Water, including lakes, streams, canals and reservoirs, compose 2.50 percent of the total area, and wetlands only 1.50 percent. The remainder of the land (1.80 percent) is described as barren.

2. Future Land Use

For determination of future land use, a combination of growth-encouraging and growth-deterring factors were considered in conjunction with the Atlanta Regional Commission (ARC) Land Use Forecast.

Historically, the dominant growth-encouraging factor in any area is ease of transportation. The relatively recent increase in population of the Upper Ocmulgee River Basin is related, in part, to the construction of Interstate 20, which improved accessibility to the Atlanta core from counties such as Rockdale, Newton, and DeKalb. Other strong factors leading to growth include employment opportunities and availability of services such as sewer systems and schools.

These factors are all present in the Yellow River Sub-basin, particularly along the U.S. 29/I-85 corridor leading to Lawrenceville, and along the I-20 corridor from I-285. Consequently, there has been a concentration of development along these corridors. This development is expected to accelerate during the study period, since there are no deterrents to growth.

This presence of growth inducers, and lack of growth deterrents, does not exist south of U.S. 78 in Gwinnett County in

TABLE II-1
SUMMARY - EXISTING LAND USE - UPPER OCMULGEE RIVER BASIN

Land Use Category (^{a})	South Sub-Basin	Yellow Sub-Basin	Alcovy Sub-Basin	Lake Jackson Sub-Basin	Totals (Acres)	(%)
11 Residential	58,754.24	35,446.88	6,980.33	1,286.94	102,468.39	
12 Commercial & Services	12,296.34	3,507.49	835.46	63.76	16,703.05	
13 Industrial	1,801.33	749.22	326.94	15.94	2,893.43	
14 Transportation, Communications & Utilities	5,808.35	2,943.14	615.94	143.47	9,510.90	
15 Industrial/Commercial Complexes	3,778.02	876.76	0	0	4,654.78	
16 Mixed Urban/Built-up Land	0	31.88	0	0	31.88	
17 Other Urban/Built-up Land	6,073.51	2,518.68	679.17	0	9,271.36	
Urban Total	88,611.79	46,134.05	9,437.84	1,510.11	145,593.79	(16.3%)
21 Cropland and Pasture	90,611.79	66,141.39	51,120.59	5,522.96	212,938.60	
22 Orchard, Groves, Vineyard	1,530.33	79.71	79.71	31.88	1,721.63	
23 Confined Feeding Operations	63.76	223.18	143.47	63.76	494.17	
24 Other Agricultural Land	0	0	63.76	15.94	79.70	
Agricultural Total	91,747.75	66,444.28	51,407.53	5,634.54	215,234.10	(24.1%)
41 Deciduous Forest Land	47,347.86	15,701.89	15,570.22	510.11	79,130.08	
42 Evergreen Forest Land	39,457.08	43,523.21	35,023.55	2,817.27	120,821.11	
43 Mixed Forest Land	103.871.56	101,438.07	59,923.81	7,260.53	272,493.97	
Forest Total	190,676,50	160,663.17	110,517.58	10,587.91	472,555.66	(53%)
51 Streams and Canals	0	0	0	0	0	
52 Lakes	175.35	111.59	47.82	0	334.76	
53 Reservoirs	6,659.06	3,969.30	2,973.81	7,099.50	20,701.67	
Water Total	6,834.41	4,080.89	3,021.63	7,099.50	21,036.43	(2.4%)
61 Forested Wetland	2,259.34	510.11	7,569.24	2,233.17	12,571.86	
62 Non-Forested Wetland	207.24	0	0	0	207.24	
Wetland Total	2,466.58	510.11	7,569.24	2,233.17	12,779.10	(1.4%)
74 Bare Exposed Rock	0	366.64	0	0	366.64	
75 Strip Mines, Quarries & Gravel Pits	430.41	478.23	127.53	0	1,036.17	
76 Transitional Areas	13,951.47	8,113.97	1,179.63	723.17	23,537.83	
Exposed Land Total	13,951.4	8,958.97	1,307.16	723.17	24,940.64	(2.8%)
Grand Total (Acres)	394,188.50	286,791.34	183,260.98	27,788.40	892,029.22	(100%)
(Sq. Mile)					1,393.80	
Lake Jackson					7.42	
					1,400.22	

(^{a})Land Use classifications are USGS Type II the Alcovy River Sub-basin, and in the southern reaches of the South River Sub-basin. Therefore development in those areas is sparse, and no substantial growth is forecast for the study period. In the Alcovy River Sub-basin, only two areas are expected to undergo major expansion: northern Gwinnett County, and the area close to I-20 at Covington.

In an effort to safeguard the Yellow River and some of its adjacent land area for recreational use, two major recreational areas are being planned in the Yellow River Sub-basin. When these areas are completed, the river will be a major recreational attraction.

Deterrents to growth can be either natural or man-made, and include such restraints as flood plains, high water table, or lack of utility services.

A listing of the major transportation corridors, together with a brief discussion of their expected impacts on development, follows:

Interstate 75: This corridor runs southeast from South Atlanta, in the South River Sub-basin. Rapid growth has already been experienced along most of this corridor, and major land use changes are not expected.

Interstate 20: This highway travels east through the South, Yellow and Alcovy River Sub-basins. Substantial land use changes are forecast, with higher density of population, greater intensity of land use, and increased non-residential uses. Rockdale County is included in this corridor, and its growth is expected to be substantially influenced. This county has already shown the highest percentage of growth of any of the study area counties from 1960 to 1970.

U.S. 78: This corridor extends from northeast Atlanta through the Yellow and Alcovy River Sub-basins, and will probably experience growth similar to that in the I-20 corridor. Industrial land uses in the Stone Mountain area will probably continue to expand.

Interstate 85: The most significant future growth in the Upper Ocmulgee River Basin is expected to occur along this corridor, which travels northwest through Gwinnett County, and joins GA 316. It provides a connection to a heavily-concentrated commercial/industrial area.

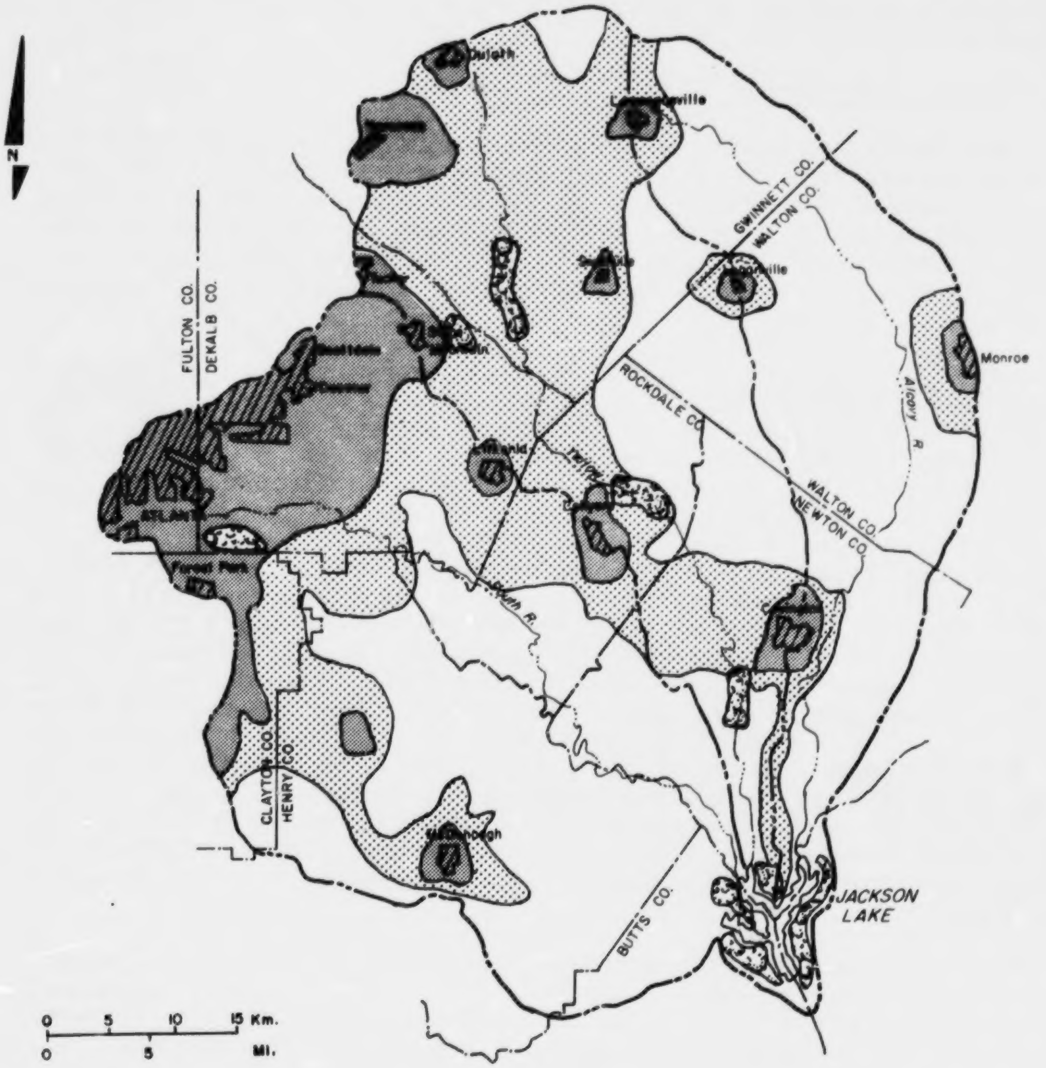
A summary of future land use in the Upper Ocmulgee River Basin is presented in Table II-2, and the distribution of these land uses is shown in Figure II-2. With regard to future land use in the Yellow River Sub-basin, the same factors will probably lead to continued growth of the urban fringe of Atlanta and the City of Snellville, as well as the Yellow River portions of DeKalb and Rockdale counties. The cities of Covington and

TABLE II-2
PROJECTED FUTURE LAND USE, UPPER OCMULGEE RIVER BASIN - 1980, 1990 and 2000

	Single Family	Multi-Family	Commercial	Industrial	Public	Parks	Transportation	Agriculture	Silva	Unsuitable	Total
SOUTH RIVER											
1980	44,445	6,572	5,133	4,371	3,667	4,784	14,177	92,608	196,031	23,204	394,992
1990	52,686	10,737	5,694	5,629	5,090	6,975	18,246	81.772	184,970	23,200	395,003
2000	58,805	15,604	7,719	7,034	5,785	7,895	21,991	73,352	173,605	23,204	394,994
YELLOW RIVER											
1980	23,063	1,131	1,324	2,908	2,185	5,123	7,212	69,248	161,321	13,561	287,076
1990	29,939	2,574	2,533	3,808	2,915	6,645	9,939	64,676	150,486	13,561	287,076
2000	37,334	4,909	4,034	5,179	3,442	7,433	12,332	60,538	138,305	13,561	287,068
ALCOVY RIVER											
1980	6,228	49	38	21	1,253	1,472	1,483	57,116	121,446	21,951	211,057
1990	8,161	81	57	35	1,368	1,593	1,713	55,702	120,390	21,951	211,051
2000	10,255	115	77	54	1,489	1,629	2,002	54,241	119,266	21,951	211,049

NOTE: All figures are in acres

FIGURE II-2


N
Duluth
Monroe
FULTON CO.
DEKALB CO.
GWINNETT CO.
WALTON CO.
ROCKDALE CO.
WALTON CO.
NEWTON CO.
Alcovy R.
ATLANTA
Forest Park
CLAYTON CO.
HENRY CO.
McDonough
BUTTS CO.
JACKSON LAKE
0 5 10 15 Km.
0 5 MI.

LEGEND

▨ URBAN MIXED

░ DEVELOPING SUBURBS

▩ RECREATIONAL

☐ UNDEVELOPED

UPPER OCMULGEE RIVER BASIN

FUTURE LAND USE

Conyers are projected to grow very rapidly, as is the community of Porterdale.

D. TERRESTRIAL BIOTIC COMMUNITIES

The term "biotic community" represents a composite of physical and biological entities. To determine this element of the EIS, U.S. Geological Survey (USGS) Level II land use maps were used, supplemented by a literature survey and by field reconnaissance. The biotic composition of the Upper Ocmulgee River Basin is described according to the land use areas previously designated.

1. Urban or Built-Up Land: This category includes land used intensively, with large areas covered by structures. The biota of this land category is determined largely by the extent to which alterations have been made to the natural settings. Thus, if site alterations have been such as to totally destroy all previous habitat (the Atlanta Airport, for example) no trace of previous biota remains. Vegetation is minimal, and the animals found are those generally associated with structures, such as house sparrows, starlings, pigeons, rats and mice. However, if the alteration has been minimal, such as may be found in recent residential developments, with some of the original canopy trees and open spaces left, the biota retains its original character, with the exception that the wildlife tends to be of a more secretive nature. If only a remnant of the former vegetation has been left, many species of wildlife such as migratory songbirds and small mammals may be found. Typical of these animals are the American robin, mockingbird, house wren, squirrels, chipmunks and moles. If a substantial degree of tree cover has been left, opossum, fox and raccoon may also be found.

If the built-up land is devoted largely to commercial/service structures, vegetation is usually limited to weedy species, commonly members of the grass, pea, and aster families, with fauna similar to that found in and around all buildings. The same is true for industrial areas.

Corridors used for tansportation, communication and utilities offer habitat for a wide variety of plant and animal species. These corridors may undergo minimal maintenance after the initial construction; hence, herbs, vines and seedlings of trees may spring up, providing habitat for small animals such as shrews, sparrows, and warblers, as well as providing a corridor along which large mammals such as the white-tailed deer and gray fox may forage and travel.

2. Agricultural Land: Agricultural land now accounts for approximately 25 percent of the land use in the project area. It is used for crops such as cotton, grain sorghum, corn, soybeans and wheat.

In addition to the planted crops, many types of weeds and perennials may be found on agricultural land, as well as occasional trees, usually young pines. Individuals of many species of birds and mammals may visit these fields or pastures to forage, including finches and grosbeaks, as well as large birds of prey such as hawks, vultures, and owls. Opossum, raccoon, skunk, fox, otter, deer, and bats also range across these fields.

There has been a substantial decline in the number and acreage of farms, particularly in Rockdale and DeKalb counties, where agricultural acreage has dropped approximately 42 percent and 64 percent, respectively. These former agricultural lands will probably be converted to urban and built-up lands in the future.

Noncultivated land such as hedgerows and thickets provide habitat for small game animals, such as cottontail, bobwhite, mourning dove, and numerous species of rodents.

3. Forest Land: By definition, forest lands have a tree-crown areal density of ten percent or more, are stocked with trees capable of producing timber or other wood products, and exert an influence on climate or water regime. The biotic composition of forest land depends on the type of tree which predominates -- deciduous, evergreen, or mixed. Deciduous forests in the project area are dominated largely by beech, white oak, tulip poplar, and sugar maple. Since the soil is generally well drained and deep, a diverse flora, particularly wildflowers, is found here. The animal composition of the deciduous forest is equally abundant and diverse. In areas where the soil is thin, often over granite, the dominant tree is the rock chestnut oak. The number and diversity of flowers is fewer, and fewer animals inhabit the area.

Evergreen forests in the project area are composed of loblolly pine, short leaf pine, or both, with a few small stands of red cedar. The herbs are generally pipissewa, elephant's foot, yellow jessamine and Japanese honeysuckle. In the winter, these pine stands may host flocks of birds of up to 15 species.

If the forested area is a mixture of pine and hardwood trees, the animal community is more varied than in either type individually, since animal diversity is positively correlated with floral diversity. Thus, the animal inhabitants are a mixture of the types which inhabit both types of forest.

4. Barren Land: Less than one-third of the area of barren land has vegetation or other cover. Soil is thin, or else there is only sand or rock. Included are sub-categories such as bare exposed rock, including areas of bedrock exposure and other accumulations of rock without vegetative cover. Stone Mountain and adjacent exposures are included in this sub-category. Biota in the bare exposed rock category is unique and characteristic of similar granite rocks in Northern Alabama

and the Piedmont of the Carolinas. Flowering plants are restricted to shallow depressions of thin, infertile soil. In the Panola Mountain area, 406 taxa of flowering plants have been recorded.

Certain outcrop species are postulated to be composed of relics of ice-age flora which once covered the Appalachian highlands. Because of the scarcity of vegetation, water, and soil, little animal wildlife is found on these granite outcrops.

E. ENDANGERED OR THREATENED SPECIES

Endangered species are defined as those in danger of extinction throughout all or a significant portion of their ranges. Threatened species are those species which are likely to become endangered within the foreseeable future. Eleven plant species native to the project area are considered to be either endangered or threatened. The endangered or threatened animals of the project area are list number five: the peregrine falcon, Southern bald eagle, red-cockaded woodpecker, ivory-billed woodpecker, and Eastern cougar.

F. WETLANDS

Included in this category are freshwater marshes, river swamps and bottomland forests, floodplains, stream banks and lakeshores. Although subject to seasonal inundations, the water-land interfaces are often sites for some urban development, particularly south and east of Atlanta, as expansion moves downslope toward the floodplains.

In 1975, DeKalb County officials requested that the Corps of Engineers prepare flood hazard information for some minor tributaries in that county. From the results of that study and others, and from maps of flood-prone areas prepared by the USGS, an estimate of a 100-year flood overflow limit was prepared. That estimate shows that the flood area could be more than one-half mile wide, with an estimated crest of the flood being 20 to 25 feet above normal, in these small stream basins.

Although wetlands compose only about 1.50 percent of the area of the Upper Ocmulgee River Basin, they are rich in variety and extent of biota. Many different types of trees may be found there, as well as many herbaceous varieties. The animal population is equally rich and diverse, with many mammals, both large and small; reptiles and amphibians; and many birds, both tree- and ground-nesting species. Particularly abundant are ducks, rails, and mergansers. No endangered species are known to inhabit these wetlands; however, transient bald eagles and peregrine falcons may feed there.

G. WATER RESOURCES

This section presents data concerning the water resources of the Upper Ocmulgee River Basin, including groundwater resources, surface water resources, and aquatic biota.

1. Groundwater Resources

Groundwater in the Upper Ocmulgee River Basin is found in the pore spaces of saprolite (residual soils) and in fractures of underlying bedrock, in water-table conditions. There are no water-bearing sedimentary formations in the Basin. Since groundwater drains away from hills, the largest quantities are found in lowlands or draws, where there is a thick mantle of soil. This water, however, exists in only small amounts. Most wells sustain only light pumping, providing water for rural homes and mobile home parks. Most drilled wells are less than 500 feet deep, and yield approximately 10 to 50 gallons per minute. Although the groundwater is generally of good quality, it may contain much iron in some areas.

2. Surface Water Resources

There are three major rivers in the Upper Ocmulgee River Basin, the South, Yellow and Alcovy rivers, which all empty into Jackson Lake. These combined rivers drain all but 150 square miles of the Basin. (See Figure I-1, Page I-2).

The largest in terms of drainage area, the South River, rises in Southeast Atlanta and flows southeasterly for about 63 miles to its confluence with the Yellow River at Jackson Lake. The Yellow River flows about 70 miles in a southerly direction from upper Gwinnett County. The Alcovy River, about 75 miles long, flows southerly from its source in eastern Gwinnett County. These converge at Lake Jackson, which has a surface area of 19.2 square kilometers, and a mean depth of 6.9 meters.

The Basin's hydrology has been changed somewhat due to the diversion of some 50 million gallons per day (MGD) by the City of Atlanta and DeKalb County. This water is drawn from the Chattahoochee River Basin and eventually is discharged to the South River as wastewater. As a consequence, wastewater flow in the South River exceeds the natural flow during periods of dry weather. However, the Three Rivers project, presently underway, will "redivert" this wastewater and return it to the Chattahoochee River from whence it originally came.

With regard to water quality, the South River Sub-basin showed a very poor rating in a 1970 study. Its oxygen resources were severely depleted, long reaches of the river having dissolved oxygen concentrations of 2.0 milligrams per liter (mg/l), compared to the 5 mg/l which is considered to be the minimum criterion for a stream to be capable of supporting warmwater fish. Fecal coliform bacteria were present in such large numbers as to make contact with the water a distinct health hazard. Four out of five upstream sections were rated as grossly polluted in terms of macroinvertebrate inhabitants. The fifth section, immediately above Lake Jackson, was considered polluted to moderately polluted. However, the water quality in the South River Sub-basin has reportedly improved somewhat since then, due to improved wastewater treatment systems.

The same study found water quality in the Yellow River Sub-basin to be generally good. However, there is concern that increasing urbanization will have a deleterious effect on it. The Alcovy River waters were classified as healthy at all stations in the 1970 study.

Lake Jackson, in a 1969 study, was found to be undergoing accelerated eutrophication as a result of nutrient loads from the South and Yellow rivers. A 1973 study found that this deterioration had progressed rapidly, with siltation and heavy algal blooms. Out of 14 Georgia Lakes studied, Lake Jackson ranked thirteenth in overall nutrient enrichment. The conclusion of the 1973 study was that enrichment trends were dependent upon control of phosphorus. Point sources accounted for over 66 percent of the total phosphorus input. Although 67 wastewater treatment facilities contributed to this total, almost 60 percent of the total was accounted for by only 5 major facilities serving Atlanta and DeKalb County, discharging to the South River. Nonpoint sources in the South River were estimated to account for more than 25 percent of the phosphorus input.

3. Aquatic Biota

a. Streams and Canals: Riverweed is the most common aquatic vascular plant found in the study area. Species such as lizard's tail and water willow may be rooted in the substrate of shallow water. Additional flora in the rivers and streams are aquatic mosses, green algae, blue-green algae, and others.

Only warmwater fishes are found in the project area. There are 69 fish species in the streams and canals, with the most abundant game fish being members of the sunfish family. Nongame fish include channel catfish and bullheads. In healthy streams, forage species such as shiners and darters are common, as well as larger predatory species. The most common macroinvertebrates include various species of mollusks.

b. Lakes and Reservoirs: The most important body of water in this category is Lake Jackson, which provides not only a place for fishing and boating, but furnishes power for Georgia Power Company's hydroelectric plant at Lloyd Shoals Dam. Dense algal populations were recorded at Jackson Lake in 1969, predominately of a green variety. In 1973, the algal populations had shifted to a predominantly blue-green variety, certain species of which are producers of a foul odor. Fish population includes bass, bluegill, sunfish. and crappie, as well as catfish and bullheads.

H. WATER SUPPLY

This section summarizes available information concerning the water supply of the Upper Ocmulge River Basin including data on the following: water demands; existing water systems; proposed system expansions; interbasin transfers; water conservation measures; and water program planning.

1. Water Demand

Projected water demands for the Upper Ocmulgee River Basin in the year 2000 are estimated to be 172.5 MGD (OBERS) to 221.6 MGD (ARC Alternative E). Projected demands for the same year for the Yellow River Sub-basin vary from 28.8 MGD (OBERS) to 67.9 (ARC Alternative E). Present and projected Upper Ocmulgee River Basin water demand is summarized in Table II-3.

2. Existing Water Sources/Systems

The Chattahoochee River, in conjunction with Lake Lanier, furnishes water to approximately 90 percent of the population of the Upper Ocmulgee River Basin, and 80 percent of the population of metropolitan Atlanta. The remainder is drawn from numerous smaller impoundments, wells, or other river systems, as summarized in Table II-4.

3. Potential New Sources of Supply

Major potential water supply areas summarized in Table II-5 include Big Haynes Creek, Big Cotton Indian Creek, Yellow River, and Alcovy River, for a total sustained yield of 173 MGD. A recreation and water supply reservoir is proposed for Big Haynes Creek, and the Atlanta Regional Commission is preparing a watershed protection program as part of the ongoing 208 planning process. However, their suitability as future water supplies is, in some cases, doubtful. For example, some headwater areas experience great fluctuation in flow.

4. Water Systems Expansion

The three major water users in the Upper Ocmulgee River Basin (City of Atlanta, DeKalb County and Gwinnett County) have all taken steps to increase their water supply from the Chattahoochee River Basin. The largest expansion is the 40 MGD intake structure on Lake Lanier, built by Gwinnett County. The smaller counties are also planning and installing system expansions, and their arrangements frequently provide for interconnection in the case of an emergency.

5. Interbasin Transfer

Interbasin transfer has been widely employed in the Atlanta area, as shown in Table II-6. A significant aspect of this

TABLE II-3
UPPER OCMULGEE RIVER BASIN
PRESENT AND PROJECTED
POTABLE WATER DEMAND

Sub-Basin and Year	Population (1000's) ARC	Population (1000's) OBERS	Population (1000's) 303(e)	Per Capita Water Demand (g/c/d)	Water Demand (MGD) ARC	Water Demand (MGD) OBERS	Water Demand (MGD) 303(e)
South							
1970	425.1	425.1	425.1	159	67.6	67.6	67.6
1980	541.8	533.5	509.4	163	88.3	87.0	83.0
1990	696.4	670.7	607.3	166	115.6	111.3	100.8
2000	845.3	805.8	708.3	168	142.0	135.4	119.0
Yellow							
1970	90.6	90.6	90.6	159	14.4	14.4	14.4
1980	190.1	115.8	103.6	163	31.0	18.9	16.9
1990	281.4	143.8	156.9	166	46.7	23.9	26.0
2000	404.1	171.6	227.3	168	67.9	28.8	38.2
Alcovy							
1970	27.0	27.0	27.0	159	4.3	4.3	4.3
1980	39.2	34.4	36.0	163	6.4	5.6	5.8
1990	54.2	42.9	41.3	166	9.0	7.1	6.9
2000	69.6	49.2	46.7	168	11.7	8.3	7.8
UORB							
1970	542.7	542.7	542.7	159	86.3	86.3	86.3
1980	771.1	683.7	649.0	163	125.7	111.4	105.8
1990	1032.0	857.4	805.5	166	171.3	142.3	133.7
2000	1319.0	1026.6	982.3	168	221.6	172.5	165.0

Notes: (a) Source: Atlanta Region Areawide Wastewater Management Plan, U.S. Army Corps of Engineers, Savannah District; Atlanta Regional Commission; State of Georgia Department of Natural Resources, Environmental Protection Division; Environmental Protection Agency Region IV, June 1976

TABLE II-4
EXISTING WATER SOURCES

Jurisdiction	Type	Source
Clayton County	Impoundment	Cotton Indian Creek
DeKalb County	Surface	Chattahoochee River
Fulton County/Atlanta	Surface	Chattahoochee River
Gwinnett County	Surface	Chattahoochee River
Gwinnett County	Surface	Lake Lanier
City of Buford	Surface	Chattahoochee River
City of Grayson	Wells	Groundwater
City of Lawrenceville	Wells	Groundwater
Henry County		
City of McDonough	Surface	Walnut Creek
Newton County		
City of Covington	Surface	Alcovy River
City of Porterdale	Surface	Yellow River
Rockdale County		
City of Conyers	Surface	Yellow River
City of Conyers	Wells	Groundwater

TABLE II-5
POTENTIAL NEW WATER SUPPLY RESERVOIRS

	Maximum Sustained Yield (MGD)	Surface Area (Acres)
Big Haynes Creek	14	350
Big Cotton Indian	30	514
Yellow River	124	2,850
Alcovy River (Cornish and Big Flat Creeks)	NA	NA

Source: Atlanta Water Resources Study & USDA, Watershed Development in Georgia, Status Report, September 1976

TABLE II-6
MAJOR RIVER BASIN WATER TRANSFERS IN THE ATLANTA REGION
(MILLION GALLONS PER DAY, AVERAGE DAY)

Year	Chattahoochee	Etowah	Flint	South	Yellow	Total	
1970							
Water Supply Withdrawal	179	12	0	10	2	203	Consumed: 35
Wastewater Discharge (1)	112	5	9	35	7	168	Transferred: 39
Difference	-67	-7	+9	+25	+5	-35	
Amount Transferred (2)	-35	-4	+9	+26	+4	39	
2000							
Water Supply Withdrawal	461	27	4	10	0	492	Consumed: 93
Wastewater Discharge (1)	263	8	25 (3)	75	28	399	Transferred: 117
Difference	-198	-9	+21	+65	+28	-93	
Amount Transferred (2)	-111	-6	+22	+67	+28	117	

Notes:
1. Does not include inflow/infiltration
2. Calculated as follows: (Wastewater flow - Water supply + percentage of water supply that is consumed).
3. Applied to a land treatment site within the basin; not discharged directly to the river.

Source: Water Supply Plan for the Atlanta Region, July, 1976, Atlanta Regional Commission.

TABLE II-7
UPPER OCMULGEE RIVER BASIN
PRESENT AND PROJECTED WASTEWATER GENERATION

Sub-Basin and Year	Populations (1000's) ARC	OBERS	303(3)	Per Capita* Wastewater Generation Rate	Wastewater Generation (MGD) ARC	OBERS	303(e)
South							
1970	425.1	425.1	425.1	127	54.0	54.0	54.0
1980	541.8	533.5	509.4	130	70.4	69.4	66.2
1990	696.4	670.7	607.3	133	92.6	89.22	80.8
2000	845.3	805.8	708.3	134	113.3	108.0	94.9
Yellow							
1970	90.6	90.6	90.6	127	11.5	11.5	11.5
1980	190.1	115.8	103.6	130	24.7	15.1	13.5
1990	281.4	143.8	156.9	133	37.4	19.1	20.9
2000	404.1	171.6	227.3	134	54.2	23.0	30.5
Alcovy							
1970	27.0	27.0	27.0	127	3.4	3.4	3.4
1980	39.2	34.4	36.0	130	5.1	4.5	4.7
1990	54.2	42.9	41.3	133	7.2	5.7	5.5
2000	69.6	49.2	46.7	134	9.3	6.6	6.3
UORB							
1970	542.7	542.7	542.7	127	68.9	68.9	68.9
1980	771.1	683.7	649.0	130	100.2	88.9	84.4
1990	1032.0	857.4	805.5	133	137.3	114.0	107.1
2000	1319.0	1026.6	982.3	134	176.7	137.6	131.6

*Wastewater generation rate assumes 80% return of water demand.

transfer, as related to the Upper Ocmulgee River Basin, is that waters taken from the Chattahoochee and Etowah rivers are eventually placed in the Flint, South, Yellow and Alcovy rivers as treated wastewater.

Rediversion offers a solution. The Three Rivers Project being currently implemented involves placing discharges from three major Atlanta wastewater treatment facilities into a major interceptor, and "rediverting" the discharges from the current receiving streams to the Chattahoochee River from whence they originally came. The purpose of this rediversion is to maintain water quality standards, as well as to protect downstream users.

6. Water Conservation Measures

Because there is a direct relationship between water supply and wastewater treatment requirements, any program that results in consumption of less water will automatically contribute to reduction of wastewater treatment capacity requirements.

At present, only two water conservation measures are being practiced in the Upper Ocmulgee River Basin. They consist of an active public education program by ARC, and the DeKalb County Water Conserving Plumbing Ordinance.

7. Water Program Planning

Work is currently being concluded on a federally funded project, the Metropolitan Atlanta Water Resources Study. The primary purpose of the study was to develop a comprehensive water resources plan for the Atlanta region. Although aimed specifically at Atlanta's situation, the study, in effect, covers a major portion of the Upper Ocmulgee River Basin.

I. WATER POLLUTION CONTROL

1. Sources of Pollution

The two major sources of pollution are:

a. Point Sources: These water pollution sources consist of domestic, commercial, and industrial discharges typically collected through a system of pipes and carried to a central point for treatment before discharge to natural streams. Also included in this category are combined (sewage and stormwater) sewer overflows.

Table II-7 shows that estimates of wastewater generation in the Upper Ocmulgee River Basin for the year 2000 vary from 131.6 MGD (303(e)) to 176.7 MGD (ARC). At present, industrial discharges have little impact on this total wastewater flow, as they contribute only a small fraction of the total.

b. Nonpoint Sources: These sources of water pollution include surface runoff from storms or street cleanings; septic tank systems which have failed and allowed pollutants to seep into the soil; and runoff from forest and agricultural areas. The runoff from agricultural areas can be important if chemical fertilizers have been used, which are then washed into streams and lakes.

2. Point Sources

a. Existing Systems/Facilities: Twelve public entities provide wastewater service within the Upper Ocmulgee River Basin. Available information concerning location, capacity, flow, treatment method and influent/effluent characteristics of the major existing wastewater treatment facilities is shown in Table II-8. The City of Atlanta has the most wastewater, and correspondingly, the largest treatment facilities. As previously noted, rediversion to the Chattahoochee River is underway for discharges of three major Atlanta treatment facilities. The diversion of this effluent should substantially improve the water quality of the South River.

b. Enforcement of Water Quality Standards: The Georgia EPD monitors stream quality, establishes effluent criteria, classifies streams as to desired standards of purity, and reviews and evaluates the design of all federally-funded wastewater treatment facilities. All point source discharges must obtain NPDES permits, under Public Law 95-217, Section 402. Authority to enforce compliance is also under PL 95-217.

With this authority, the Georgia EPD may seek court orders against treatment facilities found not in compliance with laws. Such court orders have not been issued in the Upper Ocmulgee River Basin; however, administrative orders have been issued in recent years to each of the major system operators.

c. Basin Plan/Wasteload Allocations: River basin planning for water quality management is a continuous process required under Section 303(e) of the Federal Water Pollution Control Act Amendments. Approval of the Upper Ocmulgee River Basin Water Quality Management Plan, prepared under this act, is the major federal action which precipitated this EIS.

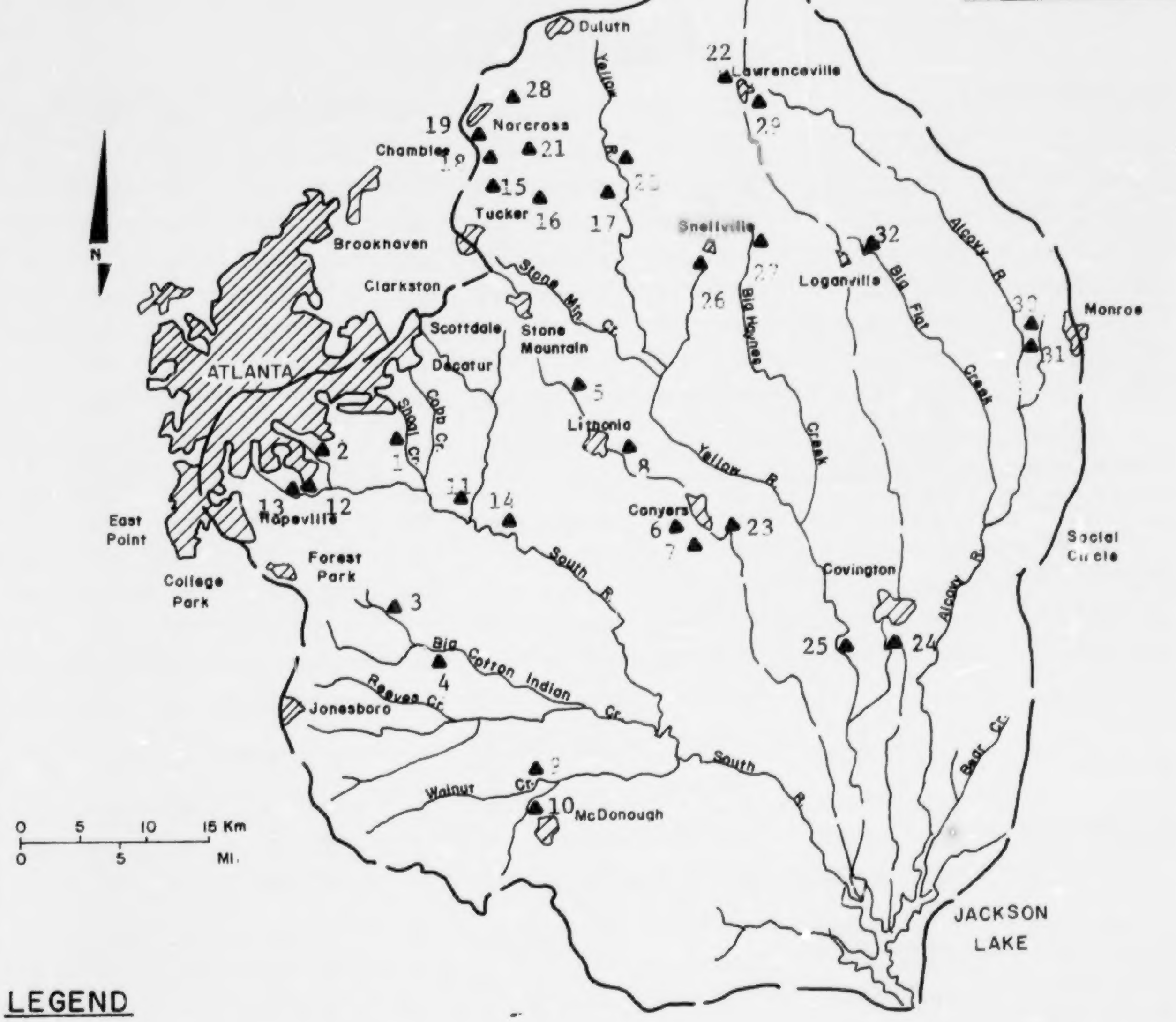
As part of their responsibility, the State must investigate each major river system within the State, with the objective of establishing stream classification, effluent requirements, and an allocation of discharge loads to each segment of each of these streams.

TABLE II-8
UPPER OCMULGEE RIVER BASIN
MAJOR EXISTING WASTEWATER TREATMENT FACILITIES

Wastewater Treatment Facilities	Location	Cap. (MGD)	Q (MGD)	Treatment	Influent (mg/l)			Effluent (mg/l)		
					BOD_5	NH_3-N	Tot. P	BOD_5	NH_3-N	Tot.P
DeKalb County Shoal Creek	Shoal Creek	3.0	3.0	Trickling Filter	206	13.1	9.25	42	NA	NA
Atlanta Intrenchment Creek	Intrenchment Creek	20.0	13.5	Trickling Filter	209	NA	NA	35	NA	4.80
Clayton County NE WPC Plant	Panther Creek	0.8	NA	Activated Sludge Polishing Pond	NA	NA	NA	NA	NA	NA
Henry County Stockbridge	Brush Creek Big Cotton Ind.Creek	0.5	NA	Activated Sludge	NA	NA	NA	NA	NA	NA
DeKalb County Honey Creek	Honey Creek	1.0	0.4	Activated Sludge	NA	NA	NA	NA	NA	NA
Conyers Almond Branch	Almond Branch Creek	1.0	NA	Activated Sludge	NA	NA	NA	NA	NA	NA
Conyers/Scott Creek Joint Venture	Scott Creek	0.3	.03‡	Activated Sludge	NA	NA	NA	NA	NA	NA
Conyers Honey Creek	McClain Branch Honey Creek South River	0.5	NA	Activated Sludge Polishing Filter Polishing Pond	NA	NA	NA	NA	NA	NA
Henry County Hudson Bridge Road	Walnut Creek South River	0.4	NA	Activated Sludge Polishing Pond	NA	NA	NA	NA	NA	NA
McDonough Municipal	Camp Creek	0.5	NA	Activated Sludge	NA	NA	NA	NA	NA	NA
DeKalb County Snapfinger Creek	South River	16	15	Trickling Filter	228	12.8	8.8	27	6.4	6.45
Atlanta New South River	South River	12.0	10.4	Trickling Filter	208	NA	6.1	30	NA	5.60
Atlanta Old South River	South River	6.0	3.8	Trickling Filter	208	NA	6.1	34	NA	5.80
DeKalb County Pole Bridge Creek	Pole Bridge Creek	3.0	1.9	Activated Sludge Chlorination	164	4.8	6.7	4.5	0.15	2.84
Vulcan Materials	Beaver Ruin Creek	0.75		Settling Pond	NA	NA	NA	NA	NA	NA
Gwinnett County Jackson Creek	Jackson Creek	2.4	0.24	Activated Sludge Polishing Filter Chemical Coagulation	92	NA	4.2	5.6	NA	NA
Gwinnett County Beaver Ruin	Beaver Ruin Creek	3.6	NA	Activated Sludge Polishing Filter Chemical Coagulation	NA	NA	NA	NA	NA	NA
Gwinnett County Springdale Estates	Beaver Ruin Creek	0.25		Activated Sludge	NA	NA	NA	NA	NA	NA
Norcross Pirkle	Beaver Ruin Creek	0.25	0.25	Aerated Pond Polishing Pond	NA	NA	NA	NA	NA	NA
Gwinnett County Northwood	Sweetwater Creek	0.5	0.16	Activated Sludge Polishing Pond Micro Screen	165	NA	NA	5.6	NA	NA
Gwinnett County Indian Trail Village	Beaver Ruin Creek Sweetwater Creek	0.3	0*	Activated Sludge Polishing Pond	NA	NA	NA	NA	NA	NA
Lawrenceville Redland Creek	Redland Creek	0.63	0.63	Trickling Filter	NA	NA	NA	56	21	NA
Conyers Boartusk Creek	Beartusk Creek	0.5	0.61	Activated Sludge	261	NA	NA	45	NA	NA
Covington Plant	Dried Indian Creek	3.0	1.88	Activated Sludge	126	9.3	18.4	3.0	0.14	17.1
Newton County WPC Plant	Yellow River	1.0	0.4	Activated Sludge	348	9.1	26.7	6.9	2.9	17.7
Snellville	No Business Creek	0.5		Activated Sludge	NA	NA	NA	NA	NA	NA
Summit Chase PUD	Big Haynes Creek	0.5		Contact Stabilization Chlorination Tertiary Filters	NA	NA	NA	NA	NA	NA
Gwinnett County Hopkins Creek	Hopkins Creek	0.6	.064	Extended Aeration High Rate Sand Fil.	NA	NA	NA	NA	NA	NA
Lawrenceville Shoal Creek	Shoal Creek	0.24	0.63	Waste Stabilization Pond	NA	NA	NA	20	16	NA
Monroe Pond # 1	Mill Branch Creek	.144	.14	Waste Stabilization Pond	171	NA	NA	31	NA	NA
Monroe Pond # 3	Mountain Creek	1.1	1.1	Aerated Pond	466	NA	NA	35	NA	NA
Loganville Imhoff Tank	Big Flat Creek Alcovy River	0.1	.29■	Imhoff Tank	NA	NA	NA	NA	NA	NA

‡ Conyers Rockdale 201 Plan
* Plant has not come on line
■ City of Loganville 201 Plan
NA Not Available

FIGURE II-3


N
Duluth
Lawrenceville
Norcross
Chamblee
Tucker
Brookhaven
Clarkston
Scottdale
Decatur
Stone Mountain
ATLANTA
Snellville
Loganville
Monroe
Lithonia
Conyers
Covington
Social Circle
East Point
Hapeville
College Park
Forest Park
Jonesboro
McDonough
JACKSON LAKE
Yellow R.
Stone Mtn. Cr.
Big Haynes Creek
Big Flat Creek
Alcovy R.
Shoal Cr.
Cobb Cr.
South R.
Big Cotton Indian Cr.
Reeves Cr.
Walnut Cr.
Bear Cr.
0 5 10 15 Km
0 5 Mi.

LEGEND

No.	Plant
1	DeKalb Co., Shoal Creek
2	Intrenchment Creek
3	Clayton NE
4	Stockbridge
5	DeKalb Co., Honey Creek
6	Almond Branch
7	Conyers Joint Venture
8	Conyers Honey Creek
9	Hudson Bridge
10	McDonough Municipal
11	Snapfinger Creek
12	New South River
13	Old South River
14	Pole Bridge Creek
15	Vulcan Materials
16	Jackson Creek
17	Beaver Ruin
18	Springdale Estates
19	Norcross
20	Northwood
21	Indian Trail Village
22	Redland Creek
23	Boartusk Creek
24	Covington Creek
25	Newton County
26	Snellville
27	Summit Chase
28	Hopkins Creek
29	Lawrenceville, Shoal Creek
30	Monroe Pond #1
31	Monroe Pond #2
32	Loganville

LOCATION
MAJOR POINT SOURCE DISCHARGES
EXISTING CONDITIONS

Effluent criteria had been established in the 303(e) Basin Plan as a major factor in achieving desired water quality within the benchmark year.

d. Wastewater Management Planning: The Atlanta Regional Commission adopted an Areawide Wastewater Management Plan for the Atlanta Region in 1976. The Areawide Wastewater Management Plan is designed to be consistent with the Regional Plan, as well as with the 1983 goals of Public Law 95-217. There are also a number of local wastewater management plans currently under development within the Upper Ocmulgee River Basin. Four of these plans are underway in the South River Sub-basin; three in the Yellow River Sub-basin; and three in the Alcovy River Sub-basin. The status of those in the South River is Step I in process for two and Step I complete for two. In the Yellow River Sub-basin, one is Step I in process and two are Step I complete. In the Alcovy River Sub-basin two are Step I in process and one is Step I complete.

3. Nonpoint Sources

The Atlanta Water Resources Study indicates that annual urban runoff (nonpoint) pollution loads are equal to point source loadings at secondary treatment levels. Therefore, as point source treatment is improved, nonpoint pollution may become critical in maintaining water quality in some water bodies. In the Yellow River Sub-basin, major water quality problems from nonpoint sources have not yet been documented, and no comprehensive management program for these pollution sources exists.

A current study by ARC seeks to determine the relationships between point and nonpoint sources and estimates of their combined impact on water quality of the region. This study, combined with one by the State of Georgia and the nonpoint source evaluation of this EIS, form the basis for future control systems planning and implementation.

The Department of Natural Resources, Environmental Protection Division, has the authority to establish a permit system for nonpoint sources; however, their past activity has been primarily concerned with point sources. In April, 1977 EPD began operating a nonpoint source pollution control permit system under Act 599, the Erosion and Sedimentation Act. The Act requires that permits be obtained for land-disturbing activities, and that permit applications include a sedimentation and erosion control plan. However, certain activities such as surface mining, granite quarrying, agriculture and forestry operations are exempted under the Erosion and Sedimentation Act.

All local governments within the Yellow River Sub-basin have now adopted some nonstructural mechanisms to reduce nonpoint source pollution. This is significant because soil loss by erosion constitutes the largest single nonpoint source pollutant, on a national basis. However, some of the smaller governmental entities lack enforcement personnel and funds to enforce these mechanisms.

J. DEMOGRAPHY AND ECONOMICS

This section outlines current and projected (year 2000) population characteristics and growth, and economic conditions in the Upper Ocmulgee River Basin and Yellow River Sub-basin.

1. Current Population

Population estimates are derived from Georgia State Data Center and U.S. Census information. The 1970 Census, as shown in Table II-9, indicated a total population of the Basin of 532,400. Table II-10 indicates that population increases in the smaller counties were significant between 1970 and 1975, with Gwinnett County ranking number one statewide in rate of change, and Rockdale and Clayton counties among the top ten. Significantly, the majority of the population of these counties resides in the Upper Ocmulgee River Basin.

The population characteristics vary from west to east, ranging from the densely urban Atlanta Standard Metropolitan Statistical Area (SMSA) to suburban and thence to rural in the eastern counties. As would be expected, the Atlanta SMSA dominates the character and direction of population change. Some differences in population characteristics of the Upper Ocmulgee River Basin include a higher percentage (26 percent) of non-white population for the Basin than for the Atlanta SMSA (22 percent), and a lower median family income than for the Atlanta SMSA, but higher than the overall Georgia State or U.S. medians. Also significant is a 79.3 percent increase in urban population in DeKalb County from 1960 to 1970, with a 34.2 percent decrease in rural population, as shown in Table II-11. Gwinnett, mentioned previously, and DeKalb counties alone accounted for 40 percent of the growth in the Yellow River Sub-basin. The increases in urban population from 1960 to 1970 have closely paralleled total growth in most instances, and this trend is expected to continue.

Much of the population growth of the Upper Ocmulgee River Basin can be attributed to the development of transportation corridors, particularly highways I-20 and I-85, and U.S. 78.

2. History of Economic Growth

The history of economic growth in the Upper Ocmulgee River Basin, as summarized in Tables II-12 and II-13, has been determined, in part, from employment data from the U.S. Census.

TABLE II-9

UPPER OCMULGEE RIVER BASIN POPULATION CHARACTERISTICS, 1970

Water Quality Management Unit (Refer to Fig. II-3)	Population (Thousands)				Employment Mean Percentage				
	Total	Non White	Median Family Income	Median Age	Manu-facturing	Trade	Service	Govern-ment	Unemployment Mean Percentage
South River	425.1	123.3	10,758	26.4	17.5	23.8	9.7	15.8	3.0
0401	316.4	106.7	11,073	26.7	16.5	24.6	9.8	15.9	2.9
0402	56.5	6.7	10,001	26.6	17.9	22.7	10.6	15.9	3.2
0403	30.6	3.7	10,279	24.1	20.0	21.6	7.8	15.4	2.9
0404	9.9	1.3	9,805	25.8	28.5	19.6	6.5	13.4	2.4
0405	11.7	4.9	7,967	25.3	26.2	15.8	10.8	17.5	3.8
Yellow River	80.3	8.8	9,656	25.6	31.0	20.8	7.0	12.7	2.2
0406	43.8	1.5	10,215	25.6	28.2	22.8	7.3	13.1	2.1
0407	16.4	1.7	9,143	25.8	34.3	19.5	6.7	12.1	2.1
0408	14.5	3.9	9,438	25.8	31.3	18.6	6.6	12.8	2.4
0409	5.6	1.8	7,839	26.0	43.1	14.6	7.0	10.6	2.5
Alcovy River	27.0	6.6	8,195	26.2	40.2	16.7	7.1	11.4	2.3
0410	16.9	3.3	8,473	26.3	38.9	18.4	7.0	11.5	2.1
0411	9.2	2.9	7,858	25.8	43.1	14.2	7.0	10.5	2.6
0412	0.9	.4	6,495	27.6	36.4	11.4	10.6	18.0	2.8
Upper Ocmulgee River Basin	532.4	138.7	10,462	26.3	20.7	23.0	9.2	15.1	2.8
Atlanta SMSA	1,390.2	309.6	10,693	26.4	19.7	23.5	9.5	15.4	3.0
Georgia	--	--	8,165	26.0	27.2	19.5	9.2	16.2	3.2

Note: Values for WQMU gained from averaging the factors over each county's population share of each WQMU.

Source: U.S. Department of Commerce Bureau of Census, 1970.

TABLE II-10
POPULATION ESTIMATES 1960, 1970, 1975

COUNTY	1960(a)	1970(b)	Statewide 1970 RANK	%Change 1960-70	1975(b)	Statewide 1975 RANK	%Change 1970-75	Ranking %Change 1970-75 RANK
Butts	8,976	10,560	(93)	17.6	12,700	(84)	20.27	(11)
Clayton	46,365	98,126	(8)	111.5	125,100	(8)	27.49	(6)
DeKalb	256,782	415,387	(2)	61.8	461,600	(2)	11.13	(34)
Fulton	556,326	605,210	(1)	9.2	591,200	(1)	-2.31	(151)
Gwinnett	43,541	72,349	(11)	66.2	112,800	(9)	55.9	(1)
Henry	17,619	23,724	(38)	34.7	27,900	(37)	17.60	(15)
Jasper	6,135	5,760	(141)	- 6.1	6,600	(132)	14.58	(26)
Newton	20,999	26,282	(36)	25.2	29,100	(35)	10.72	(40)
Rockdale	10,572	18,152	(54)	71.7	24,900	(41)	37.17	(3)
Walton	20,481	23,404	(41)	14.3	27,200	(38)	16.22	(19)
		1,298,954			1,419,100		9.20	

Source: (a) U.S. Census
(b) Annual Estimates of Population for the State of Georgia, 1975, State Data Center, Office of Planning and Budget, July, 1976, Atlanta, Georgia.

TABLE II-11
TOTAL POPULATION AND DENSITY BY URBAN AND RURAL AREAS, 1960-1970

County	Area Sq.Mi.	Population 1960				Population 1970				$ Change 1960-1970		
		Total	Density	Urban	Rural	Total	Density	Urban	Rural	Total	Urban	Rural
Butts	185	8,976	48.5	2,545	6,431	10,560	57.1	3,778	6,782	17.6	48.4	5.5
Clayton	149	46,365	311.2	30,282	16,083	98,043	658.0	79,716	18,327	111.5	163.2	14.0
DeKalb	269	256,782	954.6	217,165	39,617	415,387	1,544.2	389,303	26,084	61.8	79.3	-34.2
Fulton	530	556,326	1049.7	521.784	34,542	607,592	1,146.4	566,393	41,199	9.2	8.5	19.3
Gwinnett	437	43,541	99.6	12,863	30,678	72,349	165.6	19,132	53,217	66.2	48.7	73.5
Henry	331	17,619	53.2	—	17,619	23,724	71.7	2,675	21,049	34.7	—	19.5
Jasper	373	6,135	16.4	—	6,135	5,760	15.4	—	5,760	-6.1	—	-6.1
Newton	271	20,999	77.5	8,167	12,832	26,282	97.0	10,267	16,015	25.2	25.7	24.8
Rockdale	128	10,572	82.6	2,881	7,691	18,152	141.8	4,890	13,262	71.7	69.7	72.4
Walton	330	20,481	62.1	6,826	13,655	23,404	70.9	8,071	15,333	14.3	18.2	12.3
									Average for area:	40.6	46.2	20.1

TABLE II-12
COMPONENTS OF CHANGE IN THE UPPER OCMULGEE RIVER BASIN'S EMPLOYMENT IN MAJOR INDUSTRIAL SECTORS, 1960 - 1970

SECTORS	1960	1970	NATIONAL GROWTH	INDUSTRIAL MIX	GEORGIA SHARE	ATLANTA SMSA SHARE	BASIN SHARE	TOTAL REGIONAL EFFECT	1960-1970 TOTAL EMPLOYMENT CHANGE
Construction	14,558	22,138	2,683.5	201.2	2,494.8	865.9	1,334.7	4,695.4	7,580
Manufacturing Durable Goods	18,346	33,693	3,381.7	189.7	4,036.7	1,704.3	6,034.7	11,775.7	15,347
Nondurable Goods	27,809	31,652	5,126.0	-3,639.9	5,359.9	-2,651.9	- 351.0	2,357.0	3,843
Transportation, Communications & Public Utilities	18,818	31,613	3,468.7	- 399.9	4,605.9	3,707.5	1,412.8	9,726.2	12,795
Wholesale Trade	9,358	15,985	1,725.0	2,165.4	2,226.0	1,571.0	-1,060.4	2,736.6	6,627
Retail Trade	28,797	45,784	5,308.2	2,689.1	1,572.9	6,945.5	471.4	8,989.4	16,987
Services	39,156	60,205	7,217.6	11,921.8	10,797.7	-4,706.2	-4,181.9	1,909.6	21,049
Public Admin.	10,596	17,288	1,953.2	1,352.2	650.4	2,957.3	- 221.0	3,386.7	6,692
Total Reported	167,438	258,358	30,863.9	14,479.6	31,744.3	10,393.4	3,439.3	45,577.0	90,920

Sources: Employment Data Supplied by U.S. Department of Commerce, Bureau of Census, 1960 and 1970. Regional Share Changes were computed by Stottler Stagg & Associates.

TABLE II-13

UPPER OCMULGEE RIVER BASIN COUNTY EMPLOYMENT BY SECTOR - 1973

SECTOR	BUTTS	CLAYTON	DEKALB	FULTON	GWINNETT	HENRY	JASPER	NEWTON	ROCKDALE	WALTON
Agriculture	13	86	609	921	102	13	0	16	(D)	18
Mining/Quarrying	0	(D)	273	298	(D)	(D)	0	0	0	0
Construction	74	2,667	13,389	23,886	2,599	264	21	427	675	525
Manufacturing	704	3,560	20,362	71,014	6,131	1,885	1,005	3,208	2,794	3,712
Furniture, Lumber and Wood Products	0	535(D)	1,915	9,625	500	197	(D)	(D)	115	0
Metal Industries	0	861(D)	1,615	4,955	820(D)	0	0	0	0	(D)
Machinery except Electrical	0	179	1,029	3,034	0	(D)	0	0	0	0
Electrical Equipment	0	0	2,152	1,122	(D)	(D)	0	0	(D)	0
Transport. Equipment	0	0	(D)	9,785	0	0	0	0	0	0
Miscellaneous	0	482	1,093	4,392	118	0	0	0	135	0
Food and Kindred	0	488	2,445	7,688	(D)	0	0	0	0	(D)
Textile Products	704	(D)	(D)	9,097	377(D)	(D)	(D)	(D)	505	2,387
Print/Publishing	0	0	1,347	7,137	256	0	0	0	0	0
Chemicals & Related Products	0	0	1,967	4,468	(D)	0	0	(D)	(D)	(D)
Miscellaneous	0	0	476	9,505	633	0	0	0	0	0
Transport, Communications & Utilities	71	1,562	6,477	47,253	545	121	38	378	237	236
Wholesale	73	2,242	12,270	56,664	746	14	7	112	321	237
Retail	509	3,726	28,449	80,165	2,758	684	188	963	727	877
Finance, Insurance & Real Estate	141	792	6,590	44,645	606	101	45	131	119	196
Services	318	1,865	25,327	83,578	1,294	481	59	645	337	401
Unclassified	0	(D)	748	1,628	(D)	(D)	0	15	(D)	17
TOTAL*	1,901	16,729	114,494	409,512	14,981	3,627	1,363	5,895	5,288	6,219

*Not a summation of preceding data as figures withheld to avoid disclosure of operations of individual industries. (D) denotes figures withheld to avoid disclosure of operations of individual reporting units.

Source: U.S. Dept. of Commerce, Social & Economic Statistic Adm., Bureau of Census, County Business Patterns, 1973, Georgia.

During the decade of the sixties, nonagricultural employment increased by 54 percent. This increase was general in the industrial spectrum, with manufacture of durable goods having the highest increase (83 percent) and nondurable goods the lowest increase (14 percent). Employment in the construction, retail trade, and transportation categories also showed increases for the Upper Ocmulgee River Basin. A U.S. Department of Commerce census of employment at mid-1973 indicated that the retail trade was the largest source of employment, with manufacturing second. The lumber, wood products, furniture, and textile products industries are the largest and the most widely distributed manufacturing employers in the Basin.

3. Population Projections

Population projections by Water Quality Management Unit (WQMU) for the Upper Ocmulgee River Basin are presented in Table II-14. The WQMU delineations are depicted in Figure II-4. OBERS is based on the U.S. Census statewide population projection as disaggregated to the county level by the Georgia Office of Planning and Budget. In the Regional Development Plan, the ARC has prepared three population projections and distributions at the census tract level, using the EMPIRIC Model. The Cycle II and Alternative E projections reflect different distributions of 3.5 million in the Year 2000, while Alternative W represents the distribution of 2.5 million people. The disaggregation of these population projections to the WQMU level was prepared as a part of this EIS.

The Cycle II projections for 1980 indicates a 42 percent increase from 1970, 86 percent for 1990, and 145 percent for year 2000. The increases for population in the Yellow River Subbasin alone are considerably greater: 10.2 percent from 1970 to 1975; 94 percent for 1980; 200 percent for 1990; 340 percent for 2000. These great increases are offset by much lower increases for the Alcovy and South River Sub-basins.

4. Projected Economic Conditions

The economy of the Atlanta Region, which strongly influences the economy of the Upper Ocmulgee River Basin, will be shaped by local growth trends in population and employment, moderated or exaggerated by the performance of the national economy. Discounting these influences, the projections for this region indicate a steady growth rate for the study period. The wholesale and retail trade share (21.9 percent) of 1970 personal income is expected to decrease to 18 percent by year 2000, with an increase of from 14 percent (1970) to 18 percent (2000) in services share. Other income sources expected to increase their share are insurance, real estate, finance, and government, with a decrease in remaining income sources.

TABLE II-14

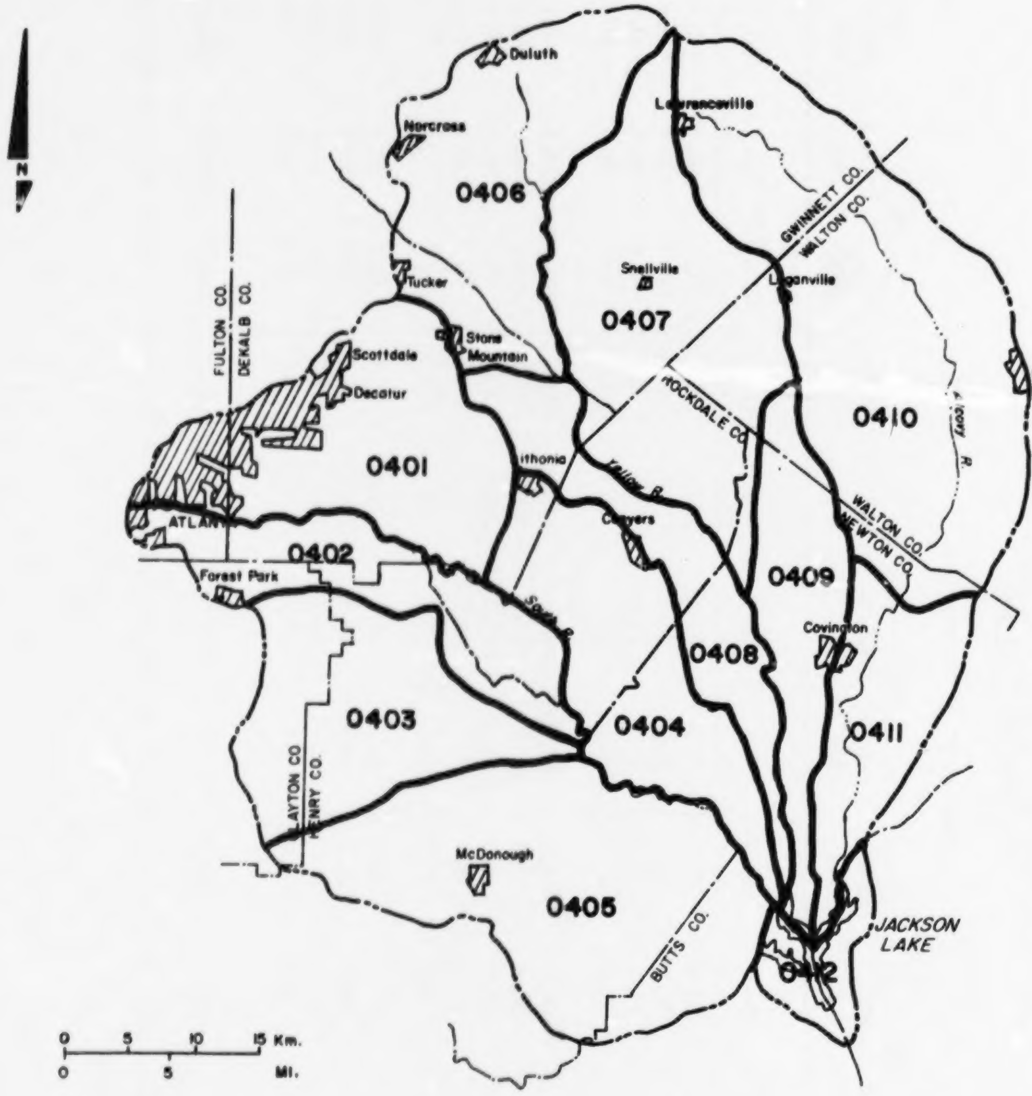
POPULATION PROJECTIONS BY WATER QUALITY MANAGEMENT UNIT

UPPER OCMULGEE RIVER BASIN

(Population in Thousands)

			ARC			ARC				ARC			
WQMU	CENSUS 1970	1975	ALT. E&W 1980	RDP 1980	OBERS 1980	ALT. E 1990	ALT. W 1990	RDP 1990	OBERS 1990	ALT. E 2000	ALT. W 2000	RDP 2000	OBERS 2000
South River	425.1	465.7	541.8	536.6	533.5	696.4	626.5	651.9	670.7	845.3	715.5	811.7	805.8
0401	316.4	346.6	371.5	378.4	397.1	461.2	413.3	440.2	499.2	515.0	444.6	493.6	599.8
0402	56.5	61.9	75.4	67.8	70.9	88.3	81.4	82.1	89.1	106.8	92.0	102.0	107.1
0403	30.6	33.5	52.6	52.4	38.4	84.0	75.0	64.9	48.3	130.8	102.8	96.8	58.0
0404	9.9	10.9	21.5	22.1	12.4	32.3	29.0	35.6	15.6	48.6	39.7	77.5	18.7
0405	11.7	12.8	20.8	15.9	14.7	30.6	27.8	29.1	18.5	44.1	36.4	41.8	22.2
Yellow River	90.3	99.6	190.1	193.4	115.8	281.4	256.1	301.6	143.8	404.1	328.5	439.6	171.6
0406	43.8	48.0	104.6	108.6	55.6	147.9	133.4	162.7	69.6	212.8	168.2	236.4	83.5
0407	16.4	17.9	36.2	34.1	20.8	59.2	53.0	60.9	26.1	91.9	74.1	96.8	31.3
0408	14.5	15.8	28.6	30.0	18.4	50.3	45.7	54.0	23.1	72.0	58.8	79.0	27.8
0409	15.9	17.9	20.7	20.7	21.0	24.0	24.0	24.0	25.0	27.4	27.4	27.4	29.0
Alcovy River	27.0	29.6	39.2	39.1	34.4	54.2	51.2	54.1	42.9	69.6	62.1	71.5	49.2
0410	16.9	18.5	26.5	26.4	21.5	38.3	35.3	38.2	27.0	52.8	45.3	54.7	32.4
0411	9.2	10.1	11.7	11.7	11.7	14.7	14.7	14..7	14.7	15.4	15.4	15.4	15.4
0412	0.9	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.2	1.4	1.4	1.4	1.4
Upper Ocmulgee River Basin	532.4	583.2	757.2	755.2	669.8	1315.9	917.7	991.5	841.3	1300.7	1087.8	1304.5	1008.3

FIGURE II-4


N
Duluth
Norcross
Lawrenceville
0406
GWINNETT CO.
WALTON CO.
Snellville
Loganville
Tucker
FULTON CO.
DEKALB CO.
Scottdale
Stone Mountain
0407
Decatur
ROCKDALE CO.
0410
Monroe
Alcovy R.
0401
ithonia
Yellow R.
Conyers
WALTON CO.
NEWTON CO.
ATLAN
0402
Forest Park
South R.
0409
Covington
0408
0403
0404
0411
CLAYTON CO.
HENRY CO.
McDonough
0405
BUTTS CO.
JACKSON LAKE
0412
0 5 10 15 Km.
0 5 Mi.

UPPER OCMULGEE RIVER BASIN
WATER QUALITY MANAGEMENT UNITS

K. ARCHAEOLOGICAL, CULTURAL, HISTORIC AND RECREATIONAL RESOURCES

The majority of historic sites in the Upper Ocmulgee River Basin date from the late nineteenth and early twentieth centuries. Many of them are antebellum homes, located for the most part outside the Atlanta metropolitan area. Other notable sites include Cyclorama Museum, the State Capitol and Old Seminary Building in Lawrenceville, and several old mill sites.

With reference to archaeological sites, one of the largest and best-preserved aboriginal steatite quarries in the southeastern United States is Soapstone Ridge, where remains have been found dating from as far back as the Archaic Period (3000 - 1500 B.C.) This is the only archaeological site in the Upper Ocmulgee River Basin which is listed on the National Register. However, there are other archaeological sites in the Basin which have not been thoroughly evaluated. Recreational facilities are scattered throughout the Upper Ocmulgee River Basin. The total acreage of these facilities is 12,365, with 5,900 additional acres projected for acquisition.

Figure II-5 shows the general location of archaeological, cultural, historic, and recreational resources in the Upper Ocmulgee Basin.

L. TRANSPORTATION

1. Existing Transportation Systems (Upper Ocmulgee River Basin)

The existing transportation systems in the Upper Ocmulgee River Basin are as shown in Figure II-6.

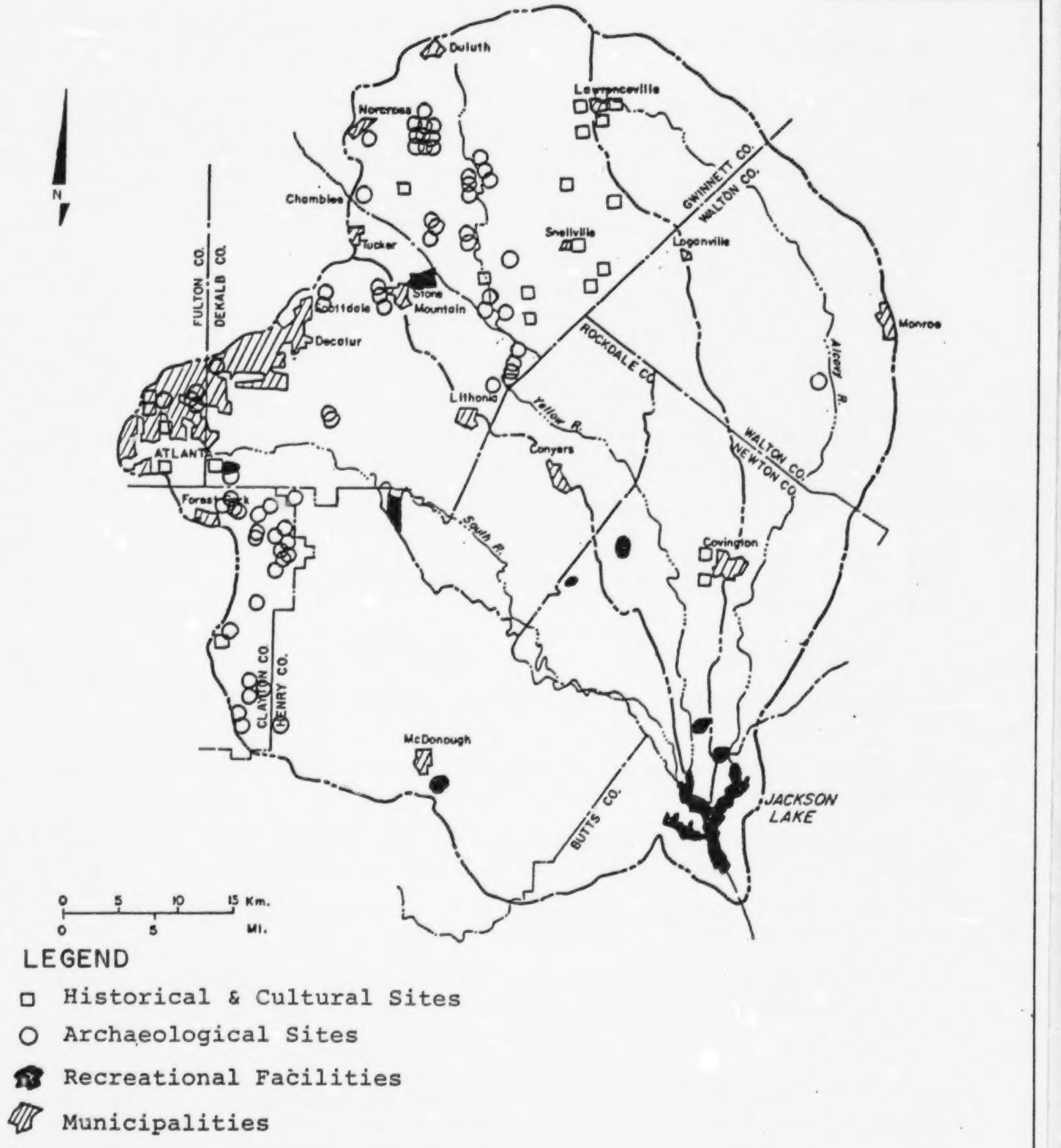
a. Roads: The highway system within the Upper Ocmulgee River Basin has been discussed in previous sections.

b. Rail Systems: Several rail companies serve the Basin, the largest of which is Southern Railway.

c. Mass Transit: The Metropolitan Atlanta Rapid Transit Authority (MARTA) serves primarily DeKalb and Fulton Counties.

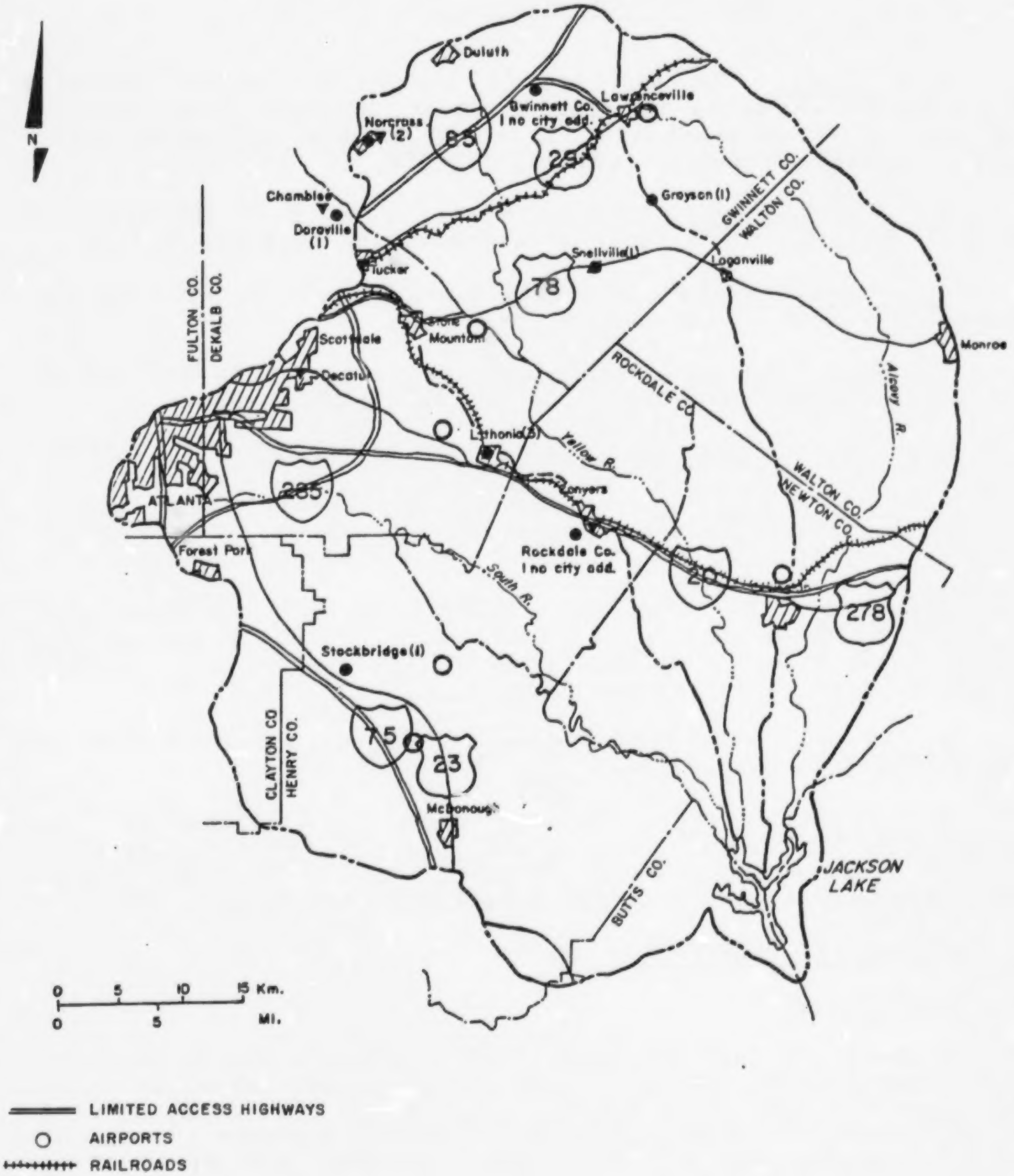
d. Air Transportation: There is no major airport within the Basin, but an airport is located at Covington, in Newton County which has an existing takeoff and landing capacity of 183,000 per year. Two new airports are proposed, one to be located in Covington, and one in Henry County. Scheduled dates for these airports to be operational are 1983 and 1993, respectively.

FIGURE II-5


Duluth
Lawrenceville
Norcross
Chamblee
Tucker
Snellville
Loganville
Stone Mountain
Scottdale
Decatur
Lithonia
Monroe
Alcovy R.
Yellow R.
Conyers
ATLANTA
Forest Park
South R.
Covington
McDonough
JACKSON LAKE
FULTON CO.
DEKALB CO.
GWINNETT CO.
WALTON CO.
ROCKDALE CO.
NEWTON CO.
CLAYTON CO.
HENRY CO.
BUTTS CO.
N
0 5 10 15 Km.
0 5 Mi.
LEGEND
□ Historical & Cultural Sites
○ Archaeological Sites
● Recreational Facilities
▨ Municipalities

UPPER OCMULGEE RIVER BASIN
ARCHAEOLOGICAL, CULTURAL, HISTORICAL
AND RECREATIONAL SITES

FIGURE II-6


N
Duluth
Norcross (2)
85
Gwinnett Co. I no city add.
Lawrenceville
29
Grayson (I)
Chamblee
Doraville (I)
Tucker
GWINNETT CO.
WALTON CO.
Snellville (I)
Loganville
78
FULTON CO.
DEKALB CO.
Stone Mountain
Scottdale
Decatur
Monroe
ROCKDALE CO.
Alcovy R.
Lithonia (3)
Yellow R.
285
ATLANTA
Conyers
WALTON CO.
NEWTON CO.
Rockdale Co. I no city add.
Forest Park
South R.
20
278
Stockbridge (I)
75
23
CLAYTON CO.
HENRY CO.
McDonough
JACKSON LAKE
BUTTS CO.
0 5 10 15 Km.
0 5 MI.
LIMITED ACCESS HIGHWAYS
AIRPORTS
RAILROADS

UPPER OCMULGEE RIVER BASIN
EXISTING TRANSPORTATION SYSTEMS

2. Existing Transportation Systems (Yellow River Sub-Basin)

a. Roads: In addition to the major higways already discussed which serve the entire Upper Ocmulgee River Basin, the Yellow River Sub-basin is served by the following major roads: Georgia Highways 162, 36, 23, 124, 20, and 138.

b. Rail Systems: Adequate rail service is provided by several systems, the largest of which is the Southern Railway.

c. Airports: As previously noted, there is one existing commercial airport, located in Covington.

d. Mass Transit: At present, mass transit is limited to the DeKalb County portion of the Yellow River Sub-basin.

3. Proposed Transportation Facilities (Yellow River Sub-Basin)

a. Major Highways: Three major highway projects are planned for the Sub-basin. These are the Lawrenceville Bypass; Interstate 420; and Interstate 675 and Southeast Connector.

b. Airports: Three new airport locations have been proposed, and, while not in the Upper Ocmulgee River Basin, the proposed expansion of Atlanta's Hartfield International Airport is anticipated to influence the metropolitan Atlanta area.

c. Rail: No major changes are proposed for service in the Yellow River Sub-basin.

d. Rapid Transit: If voter approval is secured at some future date, Gwinnett County could join the MARTA taxing district. A MARTA extension to Norcross could then be developed. This expanded service has been proposed by the Atlanta RDP.

M. NATURAL RESOURCE/ENERGY USE

1. Electricity

All of Georgia's fuel for generation of electricity is imported from other states. Georgia Power, which serves the majority of the Upper Ocmulgee River Basin, uses coal to provide 80 percent of its power. However, there is a conflict between the use of coal, primarily because of sulphur content, and air quality standards which must be resolved. At present, more expensive, low-sulphur coal is being used. This coal has a lower heat value and more ash.

Power is distributed throughout Georgia from generating plants located across the entire state. The power is transferred to a state grid, and a computer system determines the area of demand and the location which can produce the power most efficiently.

In addition to Georgia Power, which is investor-owned, the Upper Ocmulgee River Basin is also served by four Electric Membership Corporations (EMC's) and four municipally-owned systems. The EMC's have joined together to purchase power at wholesale rates. The municipal systems have also formed an organization whose activities during recent years have expanded to purchasing portions of new power plants and transmission lines built by Georgia Power.

The only power plant located in the Upper Ocmulgee River Basin is at the Lloyd Shoals Dam which forms Lake Jackson. The six generators located there have a combined capacity of 14,400 Kw. No new power plant sites are proposed for the area in the near future.

2. Natural Gas

The supply of natural gas across Georgia varies, but in general, it appears that the gas supply, while sufficient to serve the existing residential and commercial customers, will not be sufficient for all new customers in the near future. Less gas will be available for industry. Atlanta Gas Light is the largest distributor of natural gas for the Upper Ocmulgee River Basin, and its pipeline suppliers have filed curtailment plans to conserve gas supplies for residential and firm commercial customers.

3. Natural Resource Users

There are currently no manufacturing operations in the Upper Ocmulgee River Basin which use natural resources as part of their production system.

N. COMMUNITY SERVICES AND FACILITIES -- YELLOW RIVER SUB-BASIN

1. Introduction

This section discusses functions and priorities of cities and counties within the Yellow River Sub-basin. All or portions of five counties and fourteen municipalities lie within this Sub-basin. Not all of the cities provide a full range of services, relying on their county government to perform these functions. In many cases, the functions are overlapping, but may be financed differently. The distinction between municipal and county functions has been increasingly cloudy due to utilization of constitutional provisions dealing with home rule, powers of counties, and multi-purpose district provisions.

Georgia municipalities typically have a broader base of financial support than do the counties, which are more heavily dependent on the ad valorum property tax to finance activities such as schools.

2. Taxes and Capital Budgeting

a. Transportation: Federal and state governments are responsible for building and maintaining state and federal highways in the Sub-basin. Other surfaced roads are maintained by various local governments and paid for out of general funds or by a special assessment against property owners along the road. The various county road departments build and maintain roads in unincorporated areas. In the municipalities, roads are either built and maintained by the city, or by the county under a contract with the city.

b. Police Protection: The primary sources of police protection are county sheriffs, county police departments and municipal police units. General funds are the main source of financing for this function.

c. Fire Protection: A combination of city, county, and volunteer fire departments is found in the Yellow River Sub-basin.

d. Schools: Education through high school is provided by independent county school districts, run by elected boards of education and financed by federal and state governments, and the local school districts.

e. Solid Waste Disposal: Delivery of this service varies from county to county. All types are financed by user fees or other charges.

f. Water and Sewerage: DeKalb County provides water and sewer system service to unincorporated portions of the county. In Gwinnett County, city and county services are both available. Other counties offer differing services; in Rockdale and Walton counties there are no county systems.

3. Revenue Sources

The primary source of revenue for all cities and counties in the sub-basin is the property or ad valorem tax. Others may include intangible property tax, property transfer taxes and late taxes, penalties and interest.

O. OTHER PROJECTS, PROGRAMS AND EFFORTS

Two significant pieces of legislation which affect the Atlanta metropolitan area are the Metropolitan River Protection Act and the Area Plan Review Procedures granted to the ARC. Both bills provide that the ARC will pre-identify areas or programs of regional consequence, and call for a review period of 60 days for all development proposals within these designated areas. When combined with the A-95 review procedures already employed by the ARC, these legislative prerogatives give the ARC a substantial coordinating role among its constituent governments.

P. SENSITIVE AREAS

1. Introduction: This section identifies and delineates sensitive areas within the Yellow River Sub-basin, both natural and man-made. It is difficult to separate the two categories, since areas are often significant due to a combination of natural and man-made aspects.

Of primary importance in the discussion of sensitive areas is Lake Jackson. As previously stated, it is undergoing accelerated eutrophication, due to pollutants from the Atlanta urban area. Similarly, many swamp areas, important to water quality because of the filtering process they provide for discharges, are classified as sensitive areas, as are the impoundments and discharge locations of Clayton and Henry counties to Big and Little Cotton Indian creeks.

2. Sensitive Areas - Yellow River Sub-Basin: Among the sensitive areas in this Sub-basin are historic and cultural features; archaeological sites; and recreational areas. Agricultural land is considered sensitive, and the major economic impact that determines its survival is economic. The Georgia State Legislature has been considering revising the foundation on ad valorem taxation from one of fair market value to one of land use. If passed, this revision could assist materially in preserving this land use and protecting agricultural lands from development.

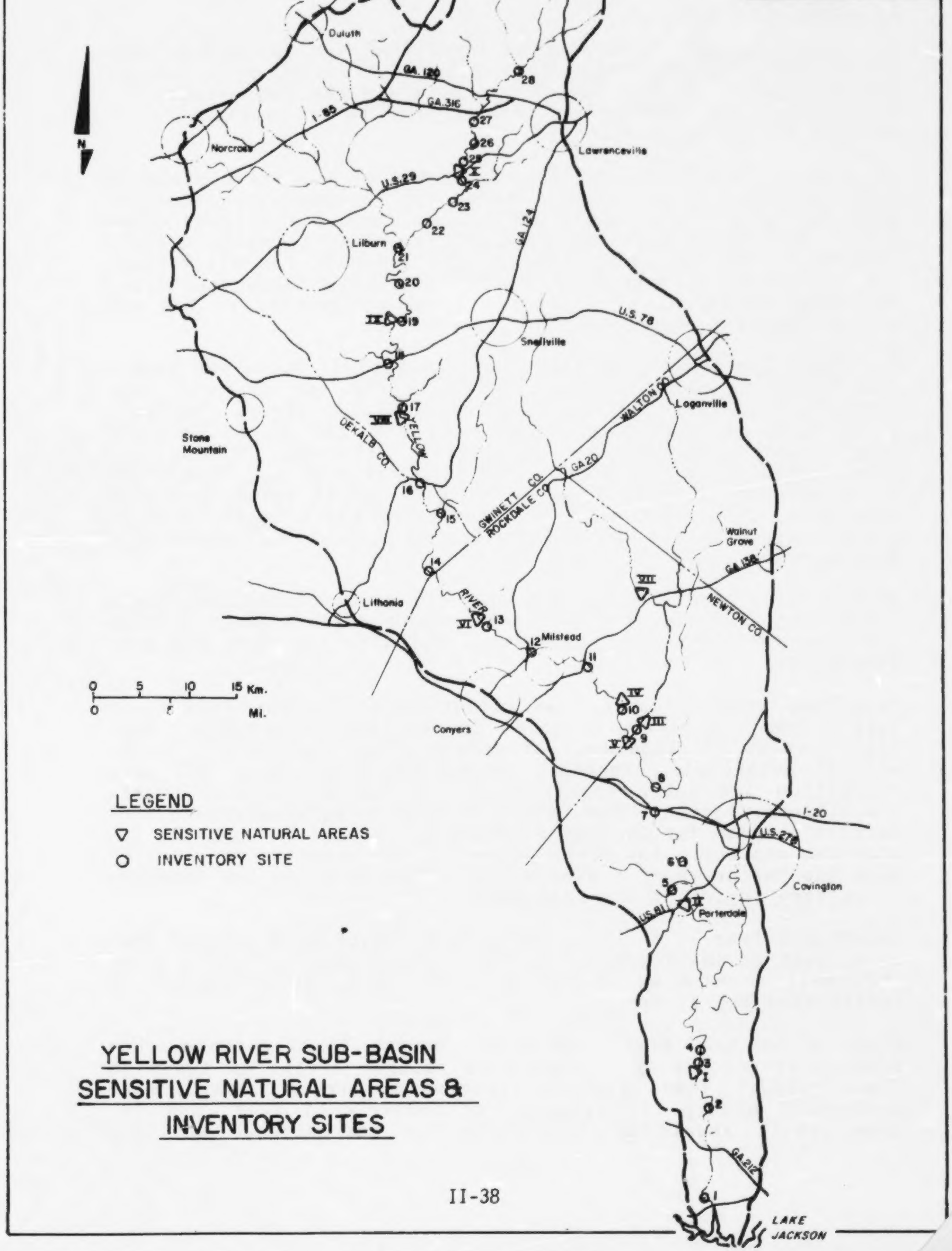
High density areas include not only the major cities previously identified, but also the transportation corridors which will be achieving high density standards, including the I-85 and I-20 corridors.

Regarding water intakes, two public water systems draw their supply from the Yellow River -- Conyers and Porterdale. Lowhead dams at Milstead and Porterdale offer significant recreational potential. Rockdale County has proposed a 350 acre recreation and water supply reservoir for Big Haynes Creek. The Atlantia Regional Commission is developing a watershed protection program for Big Haynes Creek as part of its ongoing 208 planning process. Any other potential new water source located near the "water-poor" southern tier of counties in the Sub-basin is very important and sensitive.

Unsuitable land -- that is, those lands which have natural features such as shallow depth to rock, steep slopes, highly erodible soil or high water tables -- can be severaly damaged by development activities.

Other areas have been identified through field reconnaisance efforts of this study as sensitive natural areas, as shown in Figure II-7. These include sites which are (1) habitats of endangered biota; (2) examples of undeveloped land; and (3) sites which should be considered for recreational activity

FIGURE II- 7


N
Duluth
GA. 120
28
GA. 316
I. 85
27
26
25
I
24
23
22
Norcross
Lawrenceville
U.S. 29
GA. 124
Lilburn
21
20
II
19
U.S. 78
Snellville
18
17
VIII
YELLOW
DEKALB CO.
Stone Mountain
WALTON CO.
Loganville
GA 20
GWINNETT CO.
ROCKDALE CO.
16
15
14
Walnut Grove
GA 138
VII
NEWTON CO.
Lithonia
RIVER
VI
13
12 Milstead
11
IV
10
III
9
V
Conyers
8
7
I-20
U.S. 278
6
5
II
U.S. 81
Porterdale
Covington
4
3
I
2
GA. 212
1
LAKE JACKSON
0 5 10 15 Km.
0 5 Mi.

LEGEND

▽ SENSITIVE NATURAL AREAS

○ INVENTORY SITE

YELLOW RIVER SUB-BASIN
SENSITIVE NATURAL AREAS &
INVENTORY SITES

rather than for development. These areas included a remote bottomland forest in Newton County; Cedar Shoals in Newton County; a shrub marsh and swamp along Big Haynes Creek at the Newton-Rockdale County line (which should be inventoried for those species of wildlife generally associated with wetlands); a granite outcrop with several Endangered and Threatened plants; and an outcrop, inhabited by Endangered and Threatened plant species. This last area located just south of U.S Route 78 east of Snellville, is currently being used for trash disposal.

III. WATER QUALITY INVESTIGATIONS

CHAPTER III

WATER QUALITY INVESTIGATIONS

A. INTRODUCTION

The greatest percentage of population growth in the Upper Ocmulgee River Basin through the year 2000 is projected to occur in the Yellow River Sub-basin. For this reason, the EIS was designed to focus on water quality in that sub-basin. To determine probable future water quality conditions, six scenarios were selected to gauge the sensitivity of water quality to varying populations and land uses. The scenarios were based on forecasted populations, land use, proposed facility planning, controls for point and nonpoint source pollutants, and available implementation mechanisms.

Evaluation of the six Yellow River Sub-basin planning scenarios showed that only two -- the First Edition Basin Plan and the Minimal Federal Involvement Scenarios -- would result in violation of in-stream water quality standards. However, it is unlikely that either of these scenarios would be implemented.

A significant finding of the scenario evaluation process was that each of the six scenarios would apparently continue to adversely affect Lake Jackson. Further, these adverse effects would be caused primarily by the anticipated point source discharges in the Basin.

Lake Jackson is presently experiencing high biological productivity resulting in substantial algae production and fluctuating dissolved oxygen concentrations. It is believed that this enrichment can be controlled by limiting the amount of phosphorus the lake receives from its tributaries. In addition, phosphorus is, in almost all cases, the least expensive nutrient to remove. Thus, the objective of developing alternative management strategies for possible future conditions (or scenarios) was to reduce the phosphorus load to Lake Jackson from the South, Yellow, and Alcovy rivers. Since the major contributors of phosphorus have been determined to be point source discharges most of the considered alternatives involve modification of these discharges.

B. FUTURE CONDITIONS IN THE YELLOW RIVER SUB-BASIN

1. Development of Year 2000 Planning Scenarios

The population of the Yellow River Sub-basin is projected to increase from about 100,000 in 1975 to approximately 300,000 in the year 2000. The potential impact of this dramatic increase on the water quality of the area is of major concern. However, the projection of future populations and growth is not exact.

Consequently, considerable effort was expended to determine and describe a realistic range of future planning scenarios. Once defined, the scenarios were used as data bases for projection of pollutant loads from the point and nonpoint sources associated with each particular scenario. These loads were then mathematically modeled to predict probable levels of water quality in the Yellow River and its principal tributaries. The rationale behind this representation of a range of possible future water quality conditions is to ensure the validity of the study regardless of which planning scenario proves ultimately to be the most accurate.

The key elements of the six planning scenarios are summarized as follows:

a. Population/Economic Forecast: Estimates of economic development as measured by resident population for the year 2000. Population forecasts serve as the principal bases for projecting point source loads.

b. Land Use: Forecasts of major categories of land use for the year 2000. Land use and population density forecasts provide the bases for projecting nonpoint loads.

c. Point Source Control System: The point source (i.e., municipal wastewater treatment facilities) management system associated with each scenario for the year 2000. Systems are derived from local planning efforts except for Scenario V which assumes no federal funding. In all cases, it is assumed that effluent limitations were established to meet stream standards with the requirement for reduction of phosphorus to 1 mg/l to reduce the input of phosphorus to Lake Jackson.

d. Nonpoint Source Control System: The nonpoint source (i.e., urban runoff) management system associated with each scenario for the year 2000. Systems assume enforcement of the Erosion and Sedimentation Act of the State of Georgia and existing city and county ordinances.

e. Implementation Program: The administrative and financial mechanisms supporting the point and nonpoint source control system.

The six planning scenarios for the year 2000 and the rationale for their development are summarized in Table III-1.

TABLE III-1
YEAR 2000 PLANNING SCENARIOS: YELLOW RIVER SUB-BASIN

SCENARIO	BASIS	RATIONALE
I	The First Edition, Upper Ocmulgee River Basin Water Quality Management Plan, 1975, State of Georgia Environmental Protection Division	Basis of the EIS
II	Atlanta Region Areawide Wastewater Management Plan, 1976, Atlanta Regional Commission	Representative of adopted areawide planning
III	Facilities Plans prepared pursuant to Section 201 of PL 92-500 by Gwinnett County, DeKalb County, Conyers-Rockdale County, Covington-Newton County, and the City of Loganville	A high forecast; representative of local planning
IV	Facilities Plans of Scenario III above, assuming the OBERS Series E population projections as disaggregated by the Georgia Office of Planning and Budget	The lowest forecasted population
V	Minimum Federal involvement; no further grants for new or expanded wastewater treatment facilities; ARC Alternative E Population	"No Action" Plan
VI	Facilities Plans of Scenario III, amended to reflect the year 1990 ARC population projections for the design year 2000	Population level for which EPA funding is available (subject to change based on 40 CFR Part 35 Appendix A, Sept. 27, 1978)

Major categories of land use, population by county (for portions within the Yellow River Sub-basin), and population densities are summarized for 1975 conditions and each scenario in Table III-2.

TABLE III-2
LAND USE AND POPULATION SUMMARY;
YELLOW RIVER SUB-BASIN

PARAMETER	EXISTING	SCENARIO I	SCENARIO II	SCENARIO III	SCENARIO IV	SCENARIO V	SCENARIO VI
Land use ($ Total Area)							
Urban	16.3	17.3	26.0	25.9	15.0	25.9	20.9
Agricultural	23.2	23.7	21.1	21.1	24.1	21.1	22.4
Forest	56.0	54.3	48.2	48.3	56.2	48.3	52.0
Unsuitable	4.5	4.7	4.7	4.7	4.7	4.7	4.7
Population (1000's)							
DeKalb County	15.2		61.0	96.6	26.5	61.0	50.3
Gwinnett County	48.1		237.4	259.2	83.9	237.4	173.4
Newton County	21.8		33.7	33.7	33.7	33.7	33.7
Rockdale County	11.0		67.8	40.2	19.2	67.8	41.0
Walton County	3.5		4.2	6.0	6.0	4.2	6.0
Upper Yellow River		206.0					
Lower Yellow River		21.3					
Total Population	99.6	227.3	404.1	435.7	169.3	404.1	304.8
Urban Population Density (People/Urban Acre)	2.16	4.58	5.45	5.86	3.94	5.45	5.08

A summary of the point source control system and volumes of wastewater to be generated under each scenario is given in Table III-3.

2. Water Quality Modeling Methodology

Dissolved oxygen concentrations for the Yellow River and its major tributaries were estimated for present conditions and each planning scenario under average and drought flow conditions. Average conditions were depicted to highlight the impact of nonpoint sources, and drought conditions to maximize the impact of point sources.

TABLE III-3
POINT SOURCE CONTROL SYSTEMS;
YELLOW RIVER SUB-BASIN

WASTEWATER TREATMENT FACILITY	EXISTING (1975)	SCENARIO I	SCENARIO II	SCENARIO III	SCENARIO IV	SCENARIO V	SCENARIO VI
Northwood	0.2	0.5				1.0	
Redland Creek	0.6	0.63				3.0	
Boar Tusk Creek	0.6	0.5				2.0	
Jackson Creek	0.4	2.4	2.4	2.4	1.90	4.8	2.4
Beaver Ruin	0.2	3.6	3.6	3.6	4.31	4.8	3.6
Discharge #0018		0.6					
Lawrenceville		0.8					
Mountain Mall		0.5					
Discharge #0046		0.5					
Sweetwater Creek			16.3	9.0	4.49		15.4
Conyers-Yellow River			6.1	4.0	1.83		3.93
Snellville				2.0	0.69	0.75	1.53
Hopkins Creek						1.0	
Indian Trail						1.0	
Summit Chase						0.5	
1						3.25	
2						3.1	
3						4.75	
4						4.6	
5						3.4	
6						1.2	
7						0.25	
Newton Co. WPC	0.4			1.8			1.8
Covington	1.9			3.0			3.0
Yellow River Total	4.3	10.03	28.4	25.8	13.22	39.40	31.66

Average flow stream conditions by season were simulated using a linkup of the QUAL II and TRUE mathematical models. In this linkup, data obtained using the TRUE model to project nonpoint loads were combined with data for point source discharges developed for each scenario condition. The QUAL II model was then used to estimate the combined water quality impacts of point and nonpoint loads for winter, spring, summer, and fall average conditions.

Drought flow conditions were simulated using a second version of the QUAL II Model developed specifically for low flow conditions.

The linked QUAL II/TRUE Model underwent extensive calibrations and verification. The linked version of QUAL II was calibrated and verified using Yellow River conditions using the results of two intensive five-day field sampling programs conducted in the winter and summer of 1977.

These consisted of time of travel measurements, velocity/depth measurements, water quality sampling, and point source sampling.

The TRUE model was calibrated and verified with two sixty-day sampling programs in the winter and summer of 1977. Three small watersheds of known land use representing urban, suburban, and rural conditions were sampled each day for water quality and flow. Once the seasonal nonpoint loadings from these small watersheds were quantified, the results were extrapolated to approximately 80 watersheds throughout the Yellow River Subbasin. Average seasonal nonpoint loads of BOD, total nitrogen, and total phosphorus to the Yellow River were then computed and applied to the Yellow River.

The second version of the QUAL II Model, developed exclusively to simulate DO profiles in the main stem of the Yellow River during flow (7Q 10) conditions did not undergo extensive calibration and verification in the classical sense, but was formulated using data obtained from various EPA and EIS-related field studies. Time of travel data were obtained from EIS-related investigations conducted in the river in January and July of 1977. Reaeration rates were calculated using the results of several field surveys made by the Georgia EPD in November 1973. Carbonaceous and nitrogenous decay rate were estimated on the basis of observations of rates in other streams having similar flows and wastewater discharge characteristics. 7 Day, 10 Year (7Q 10) low flows were estimated by USGS from their records.

3. Water Quality Modeling Results

All seasonal simulations for each planning scenario showed acceptable dissolved oxygen levels throughout the Yellow River and the major tributaries studied. The values changed almost entirely in response to seasonal changes in water temperature; the combination of point and nonpoint source loads had little impact on the oxygen reserves of the system under the conditions studied. Dissolved oxygen levels ranged from 7 to 9 mg/l for scenario simulations during the summer season, and from 11 to 12 mg/l for winter season estimates.

Drought condition simulations which were developed to assess the impact of point source discharges showed overall lower dissolved oxygen concentrations than did the seasonal simulations. As previously stated, all point sources associated with the six planning scenarios assume compliance with the effluent limitations required by the Georgia Department of Natural Resources. In the Existing Conditions case,effluent concentrations represent those reported by each facility and/or measured during the intensive field sampling programs.

Within the accuracy of the mathematical model and its data, the simulations show violations of a dissolved oxygen standard of less than 5 mg/l only in the Existing Conditions case and Scenarios I and V -- the Basin Plan and Minimum Federal Action Scenarios. In the case of Existing Conditions, unacceptable dissolved oxygen levels are shown between river mile points 58 (the discharge of the Hopkins Creek treatment plant) and 50 (the confluence of Sweetwater Creek). Although not as severe as in the Existing Conditions case, violations of the dissolved oxygen standard were estimated for Scenarios I and V at approximately river mile 55. In both of these cases, the dissolved oxygen profiles show rapid recovery.

It should be noted that Scenarios II, III, IV, and VI are estimated to maintain the dissolved oxygen standard of 5 mg/l not only in the Yellow River but in Sweetwater Creek as well. The existing Beaver Ruin and Jackson Creek advanced waste treatment plants are located in the small Sweetwater Creek basin and are components of all six planning scenarios.

Estimated dissolved oxygen levels in the main stem of the Yellow River under Existing Conditions and each planning scenario are shown in Figure III-1 (a-g). All figures represent drought (low flow) conditions.

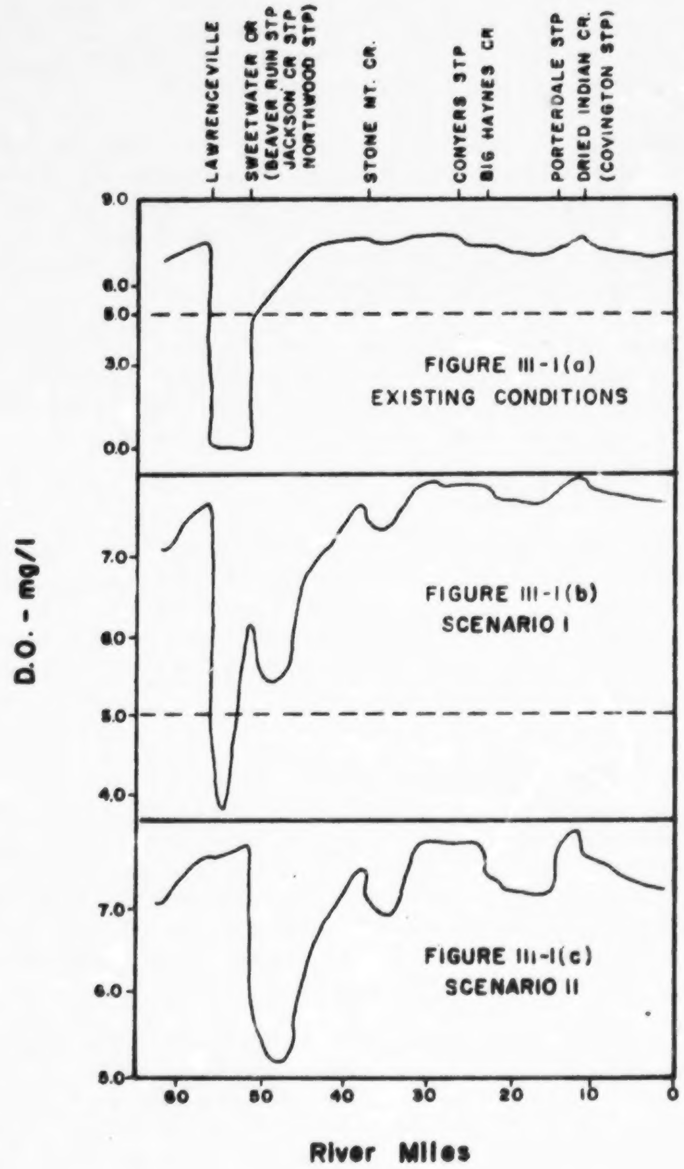
4. Other Scenario Conditions

The primary area of consideration in comparing the six planning scenarios was future water quality. Variations among the scenarios in terms of water quality are a function of the varying population levels and wastewater management system configurations and capacities. However, other segments of the future man-made, natural, and institutional environments were also investigated.

a. Land Use: For comparison purposes, land use projections were directly related to population projections (refer to Table III-2). Allocation and distribution of population to specific areas, with resultant changes in land use, is the perquisite of local government. Generally, however, the need for residential, commercial, industrial and public lands increases as the population increases. At the same time, agricultural, forested, and open space lands decrease.

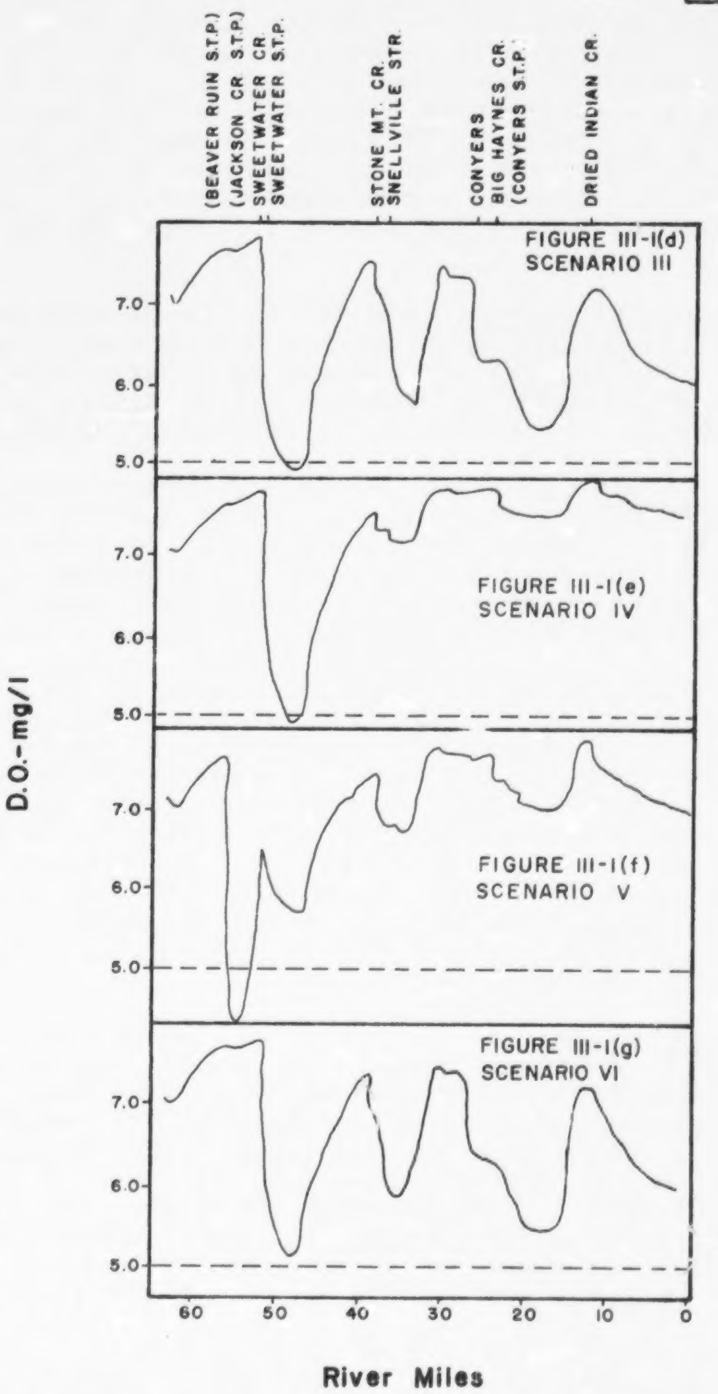
Future land use is dependent to some degree on the number, location, and capacity of wastewater treatment facilities and interceptor sewers. Scenario I, which provides for a large number of small-capacity treatment facilities, would encourage a low-density sprawl development pattern. Scenarios II, III, IV and VI would encourage greater residential development in the interceptor corridors. However, extension of sewer lines throughout the Sub-basin could cause development to occur in a pattern similar to that of Scenario I. Finally, Scenario V (minimum federal involvement) would further encourage suburban sprawl through the proliferation of large numbers of small and private treatment facilities and septic tanks.

FIGURE III-I (a.b.c)



ESTIMATED D.O. LEVELS IN THE MAIN STEM OF THE YELLOW RIVER UNDER LOW FLOW CONDITIONS

FIGURE III-I (d.e.f.)



ESTIMATED D.O. LEVELS IN THE MAIN STEM OF THE YELLOW RIVER UNDER LOW FLOW CONDITIONS

b. Demography: Population increases under the various scenarios range from a doubling of the present population under Scenario I to an increase of approximately four fold under Scenarios II, III, and V. However, even with a four-fold increase, gross urban densities will be only about five people per acre. This translates to about 1.5 dwelling units per acre of urban land, or roughly .75 acres per dwelling unit. These are average figures; areas of concentrated development within the Sub-basin will greatly exceed these densities. Urban population densities under each scenario are shown at the bottom of Table III-2.

c. Transportation: Similar to the provision of interceptor sewers, transportation system location and timing has a direct impact on the location and timing of development. Traffic volume and pressure for transportation system improvements generally increase in porportion to population increases.

New highways induce both high density intensive development and low density dispersed development. High density residential development is influenced by accessibility to major employment centers while commercial development is influenced by accessibility to residential areas. Industrial development depends in large part on accessibility to labor pools.

Generally, circumferential highways such as I-285 provide access to more people and jobs than do radial highways such as I-20 and I-85. Consequently, intensive development is likely to be greater along circumferential highways. In any case, travel time to new highways is critical to the development of an area. A ten to fifteen minute ride to the new highway will generally render an area attractive for development. Consequently, the areas likely to experience the greatest developmental pressures due to transportation accessibility are the areas easily accessible to Route 78 (Stone Mountain Freeway) and the interchanges of I-20 and I-85.

d. Resource Use: A recent study of energy use in the Washington, D.C. Metropolitan area is broadly applicable to the Yellow River Sub-Basin. The Washington study showed that residential energy use represented one-half of the regional energy consumed while that used by the commercial, industrial and institutional sector represented about one-third of the regional total. This would indicate that the higher the residential population of an area, the higher its total energy use. Thus, a higher population scenario would probably consume a disproportionately larger amount of energy than those with lower populations.

The Washington study also indicated that residential development between now and the year 2000 could decrease projected energy use by about one-third were it to occur at higher densities rather than low density sprawl. Clearly, those wastewater management configurations which encourage suburban sprawl also encourage higher total energy consumption.

e. Potable Water Supply: Gwinnett County obtains its potable water from the Lake Lanier - Chattahoochee River system and will continue to do so through the planning period. However, several jurisdictions, including the City of Conyers, Rockdale County and the City of Porterdale, use the Yellow River as a source of potable water and plan to continue to do so. Those scenarios which incorporate a larger number of small treatment facilities (Scenarios I & V) have been shown to have the greatest potential for adversely impacting water quality in the Yellow River and, consequently, affecting the river's future water supply potential.

f. Community Services and Facilities: The need for provision of adequate community services and facilities is a function of population. The greater the population, the greater the need for more services and facilities.

Community service needs associated with each planning scenario were determined by applying a set of standards to the population of each scenario. These standards are shown in Table III-4. The result of this application of standards is an estimate of the amount of recreational facilities, schools, fire protection facilities, etc., that would be needed for a given population. These estimates are not absolute, but rather desired levels which are used as long-range planning tools to aid in the programming of public expenditures. No attempt has been made to include locational or distribution criteria. These are the responsibility of local government. Estimates of community services which would be desireable under each planning scenario are shown in Table III-5.

C. POLLUTANT LOADINGS TO LAKE JACKSON

Lake Jackson is an impoundment with a surface area of 19.2 square kilometers and a mean depth of only 6.9 meters (refer to environmental inventory). It is fed by the South, Yellow, and Alcovy rivers and has for some time shown outward signs of over-enrichment such as periodic dissolved oxygen depletion and growths of nuisance algae.

Since it is the ultimate recipient of most water-borne wastes generated in the Upper Ocmulgee Basin, a macro-nutrient input study was conducted on the lake upon completion of the Yellow River Sub-basin water quality investigations. Present and future average annual loadings of BOD, total nitrogen, and total phosphorus to Lake Jackson from point and nonpoint sources in the South, Yellow, and Alcovy sub-basins were computed. Future loadings from the Yellow River Sub-basin were calculated for each of the planning scenarios shown in Table III-3 while those from the South and Alcovy sub-basins were determined only for Scenario II, the Atlanta Region Areawide Wastewater Management Plan Scenario. Table III-6 summarizes the existing conditions (1975) and for the year 2000 for Scenarios II, III, and V in the South and Alcovy sub-basins. Because the ARC's recommended

TABLE III-4
COMMUNITY SERVICE STANDARDS

Public Service	Standard Used	Source
Playground	1.5 ac/thou. population	"Park and Recreational Facility Standards" Atlanta Regional Commission - Sept., 1976
Neighborhood Parks	2.5 ac./thou. population 10 ac. ave. size	"Park and Recreational Facility Standards" Atlanta Regional Commission - Sept., 1976
Community Park	2.5 ac./thou. population 50 ac. ave. size	"Park and Recreational Facility Standards" Atlanta Regional Commission - Sept., 1976
Large Urban Parks	3.0 ac./thou. population 125 ac. ave. size	"Park and Recreational Facility Standards" Atlanta Regional Commission - Sept., 1976
Regional Parks	15.0 ac./thou. population 400 ac. ave. size	"Park and Recreational Facility Standards" Atlanta Regional Commission - Sept., 1976
Elementary School (12% of Tot. Pop)	1/750 elementary age pupil	Georgia Department of Education
Middle School (6% of Tot. Pop)	1/1000 middle school age pupil	Georgia Department of Education
Senior High School (6% of Tot. Pop)	1/1500 Senior school age pupil	Georgia Department of Education
Teachers	1/25 pupils	Georgia Department of Education
Water Demand	145 gals/day/person	"Water Supply Plan for the Atlanta Region, Atlanta Regional Commission - July, 1976
Solid Waste Generation	6 lbs/day/person	"Impact Analysis Criteria" East Central Florida Regional PlanningCouncil - 1975
Sanitary Landfills	4 ac./10 thou. population	"Planning Design Criteria," Chiara, 1969
Hospital Beds	5/thou. population	"Impact Analysis Criteria," East Central Florida Regional Planning Council - 1975
Firemen	2/10 thou. population	"Impact Analysis Criteria," East Central Florida Regional Planning Councill - 1975
Pumper Companies	2/thou. population	"Impact Analysis Criteria," East Central Florida Regional Planning Council - 1975
Policemen	2.5/thou. population	"Impact Analysis Criteria," East Central Florida Regional Planning Council - 1975
Neighborhood Shopping Centers	1/4000 population - 6 ac. ave. size	"Planning Design Criteria," Chiara, 1969
Community Shopping Centers	1/35,000 population 20 ac. ave. size	"Planning Design Criteria," Chiara, 1969
Regional Shopping Centers	1/150,000 population 70 ac. ave. size	"Planning Criteria," Chiara, 1969
Light Industry	2 ac./thou. population	"Planning Design Criteria," Chiara, 1969
Heavy Industry	10 ac./thou population	"Planning Design Criteria," Chiara, 1969

TABLE III-5
COMMUNITY SERVICE REQUIREMENTS
YELLOW RIVER SUB-BASIN

	Existing	Scenario I	Scenario II	Scenario III	Scenario IV	Scenario V	Scenario VI
Population	99600	227250	404100	435700	169300	404100	304800
Playgrounds Ac/Fac	149/50	341/114	606/202	654/218	254/85	606/202	457/152
Neighborhood Parks Ac/Fac	249/25	568/57	1010/101	1089/109	423/42	1010/101	761/75
Community Parks Ac/Fac	249/5	568/11	1010/20	1089/22	423/8	1010/20	761/15
Large Urban Parks Ac/Fac	299/2	682/5	1212/10	1370/10	508/4	1212/10	914/7
Regional Parks Ac/Fac	1494/4	3410/9	5988/15	6431/16	2152/5	5988/15	4572/11
Elementary Schools Student/Fac	11962/16	27270/36	48492/65	52284/70	20316/27	48492/65	36603/49
Middle Schools Student/Fac	5976/6	13635/13	24246/24	26142/26	10158/10	24246/24	18288/18
Senior High Schools Student/Fac	5976/4	13635/9	24246/16	26142/17	10158/7	24246/16	18288/12
Teachers 1/25 Students	957	2182	3879	4183	1625	3879	2926
Water Demand MGD	14	33	59	63	25	59	45
Solid Waste Generation tons/day	299	682	1212	1307	508	1212	914
Sanitary Landfills Acres	37	91	164	177	68	164	122
Hospital Beds	498	1137	2020	2179	847	2020	1522
Firemen	199	455	808	871	339	808	609
Pumper Companies (4-man teams)	20	23	40	44	17	40	28
Policemen	249	568	1010	1089	423	1010	761
Neighborhood Shp. Ctr. Ac/Fac	150/25	342/57	606/101	654/109	252/42	606/101	457/76
Community Shp. Ctr. Ac/Fac	60/3	120/6	240/12	240/12	100/5	204/12	168/9
Regional Shp. Ctr. Ac/Fac	70/1	70/1	140/2	140/2	70/1	140/2	105/2
Light Industry (Acres)	199	455	808	871	339	808	609
Heavy Industry (Acres)	996	2273	4041	4357	1693	4041	3048

TABLE III-6
POINT SOURCE CONTROL SYSTEMS;
SOUTH AND ALCOVY SUB-BASINS

	FLOWS, MGD			
WASTEWATER TREATMENT FACILITY	EXISTING 1975	SCENARIO II	SCENARIO III	SCENARIO V
Snapfinger Creek	15.0	29.1	31.4	29.1
Polebridge Creek	1.9	15.2	0	7.8
** Cotton Indian Creek		15.0	15.0	15.0
*Intrenchment Creek	13.5	0	0	0
Shoal Creek	3.0	0	0	0
*South Rivers	14.0	0	0	0
South River Total	47.6	59.3	46.4	51.9
Monroe	0	1.9	1.9	1.9
Loganville	0	0.6	0.6	0.6
Shoal Creek	0.63	0	0	0
Monroe Pond #1	0.14	0	0	0
Monroe Pond #2	1.10	0	0	0
Alcovy River Total	1.87	2.5	2.5	2.5

*Flows diverted to Chattahoochee River; no impact on water quality of Lake Jackson; not considered in economic evaluation of alternatives.

**On basis of current (1980) situation, construction of the Cotton Indian Creek plant is unlikely in the near future.

plan (Scenario II) calls for rediversion of flows from Atlanta's Intrenchment Creek and South River Plants to the Chattahoochee River, the wastewater contributions of these two facilities are not included in the projections of future (year 2000) loads for all scenarios from the South River Sub-basin to Lake Jackson. That is, under the Scenario conditions assumed herein the wastewater flows from the Intrenchment Creek and South River plants have no impact on the water quality of Lake Jackson.

Lake Jackson is believed to be phosphorus limited. That is, phosphorus is considered to be the nutrient which can control the growth of algae in the lake. Control of this plant growth will, in turn, improve the lake's overall water quality. Table III-7 summarizes present and future average annual total phosphorus loadings to Lake Jackson from point and nonpoint sources in the South, Yellow, and Alcovy sub-basins.

As shown in Figure III-2 (Total Phosphorus Loadings to Lake Jackson from the Yellow River Sub-basin), emission rates of nonpoint source phosphorus vary seasonally. This is due primarily to climatological factors. Point source discharges remain constant regardless of the season. The most important conclusion to be noted from Table III-6 and Figure III-2 is that point sources presently contribute approximately 85 percent of the total phosphorus loading to Lake Jackson. Further, although this percentage is expected to decline with implementation of the 1 mg/l effluent limitation, point sources will continue to contribute by far the largest percentage of phosphorus loadings to the lake under any of the planning scenarios. Anticipated point source contributions range from 58 percent of the total lake input under Scenario I to 68 percent under Scenario V. The average ratio of point to nonpoint source phosphorus contributions under all scenarios is approximately 64 percent to 36 percent.

D. CURRENT CONDITION OF LAKE JACKSON

1. Previous Studies

Created as a hydroelectric impoundment by the Georgia Power Company in 1911, Lake Jackson has since become important as a recreation resource. It is easily accessible from the Metro Atlanta area and is a popular lake for fishing, boating, and other water-oriented forms of recreation. The lake has an overall surface area of 19.2 square kilometers, a mean depth of 6.9 meters, a maximum depth of 27 meters, a volume of 132 million cubic meters, and a mean hydraulic detention time of approximately 31 days.

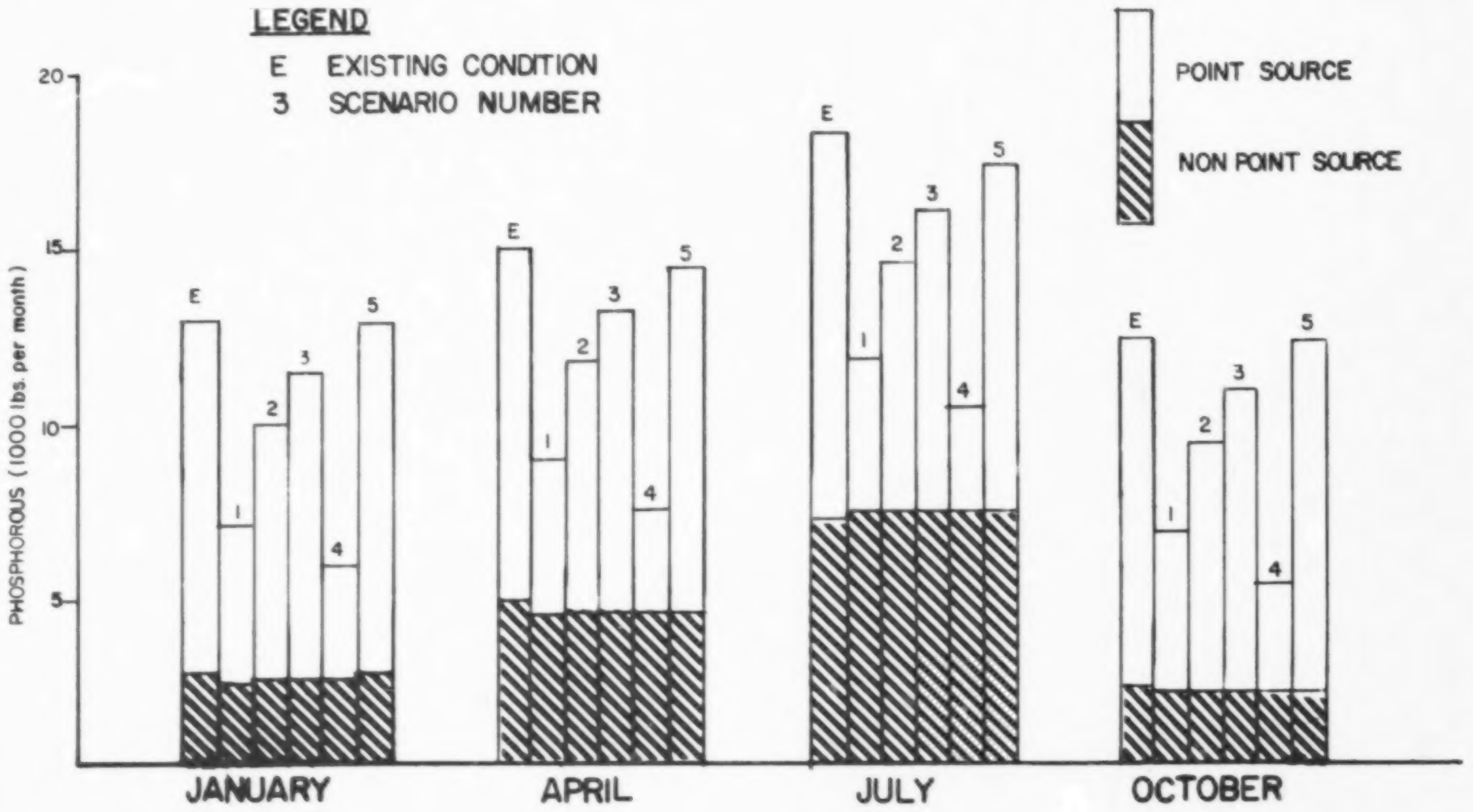
TABLE III-7
AVERAGE ANNUAL TOTAL PHOSPHORUS INPUTS TO LAKE JACKSON

Sub-Basin	Case	POINT SOURCE LOAD TP	NONPOINT SOURCE LOAD TP	TOTAL* LOAD
SOUTH RIVER	Existing	823	67	890
	Future	181	60	241
ALCOVY RIVER	Existing	31	40	71
	Future	8	40	48
YELLOW RIVER	Existing	67	53	120
	Future:			
	Scenario I	31	58	89
	Scenario II	96	49	145
	Scenairo III	64	47	111
	Scenario IV	40	46	86
	Scenario V	120	46	166
	Scenario VI	82	46	128
LAKE JACKSON	Existing	921	160	1081
	Future:			
	Scenario I	220	158	378
	Scenario II	285	149	434
	Scenario III	253	147	400
	Scenario IV	229	146	375
	Scenario V	309	146	455
	Scenario VI	271	146	417

*NOTE: Input loads are in thousands of pounds.

FIGURE III-2

TOTAL PHOSPHORUS LOADINGS TO LAKE JACKSON FROM THE YELLOW RIVER SUB-BASIN



Since the late 1960's, Lake Jackson has been the subject of several studies to determine the nature of its pollutant loadings and its reaction to them. In 1969, the Georgia EPD found the lake to be undergoing accelerated enrichment as a result of nutrient loads from the South and Yellow rivers. A 1973 study by the National Eutrophication Survey (NES) found that this deterioration had progressed. Siltation and intense blooms of blue-green algae were conspicuous problems. Lake Jackson was ranked thirteenth in overall enrichment of the fourteen lakes studied in Georgia. NES data indicated that phosphorus was the limiting nutrient, and concluded that reversal of enrichment trends was dependent upon phosphorus control.

In 1974, an analysis by EPA, Region IV, suggested that light may be a limiting factor in the lake. The study noted that removal of both nitrogen and phosphorus would have little or no beneficial impact, but that a substantial reduction in phosphorus input alone would force phosphorus to be the limiting nutrient. The EPA analysis indicated that the 31-day theoretical mean detention time of the lake may be overly conservative due to the high level release of water at the Lloyd Shoals Dam. The study concluded that reduction of phosphorus loading would probably bring about the most rapid improvement in the lake.

2. Comparison of Lake Jackson with Other Lakes in Georgia

Geologically, all lakes are relatively temporary or shortlived features. Eutrophication -- the aging process of lakes -- involves the evolution of a lake into a marsh and, eventually, the disappearance of the marsh. During eutrophication, the lake is essentially "choked" by plant life as a consequence of nutrients and sediment received over a period of time. In nature, this process is very slow. However, when the lake receives unnaturally high loads of nutrients and sediment from the activities of man, "cultural" eutrophication occurs and the process accelerates dramatically.

Oligotrophic, mesotrophic, and eutrophic are terms often used to describe the trophic (or nutritional) level of lakes. Oligotrophic lakes are typically deficient in plant nutrients and have abundant dissolved oxygen. Eutrophic lakes are rich in dissolved nutrients and, typically, experience seasonal dissolved oxygen deficiencies. In extreme cases, fluctuating dissolved oxygen levels, fishkills, and algal blooms can occur. Mesotrophic lakes are between these two stages; that is, they have passed through the oligotrophic stage but are not yet eutrophic.

The trophic classification of a lake basically involves comparing the total nutrient load to the lake with its depth and hydraulic retention time. On this basis, Lake Jackson is classified eutrophic or enriched. However, rigid application of a trophic classification to a lake can be misleading. A lake which has been technically classified eutrophic may, in fact, be suitable for a range of uses not usually associated with that classification.

A broader perspective is needed. For this reason, the trophic level of Lake Jackson has been compared with that of the other lakes in Georgia which were studied by the National Eutrophication Survey. This relationship is shown in Figure III-3.

In Figure III-3, the horizontal number line shows the ratio of the calculated total phosphorus input to the phosphorus loading associated by Vollenweider with eutrophic (or over-enriched) conditions. According to this method, a ratio greater than 1.0 denotes a eutrophic lake. However, Lake Lanier, Clark Hill Reservoir, and Lake Allatoona each have a calculated loading ratio between 1.0 and 2.0. These are lakes not usually associated with over-enriched conditions. Thus, the present quality of the comparison lakes suggests that the phosphorus loading ratio should probably be shifted to between 2.0 and 3.0 as representative of the threshold of adverse enrichment for lakes in Georgia.

When looking at Figure III-3, note that the abscissa (horizontal number line) shows a logarithmic scale and not a straight-line progression. The magnitude of the enrichment problem in the reference lakes increases dramatically as the graph is read from left to right. In addition, note that the graph shows not only Lake Jackson but the Alcovy and South/Yellow River arms as well. There is a great difference in the current condition of these arms.

E. FUTURE CONDITION OF LAKE JACKSON

The existing requirement for discharge of not more than 1.0 mg/l total phosphorus by any new discharge in the Upper Ocmulgee Basin will greatly benefit Lake Jackson. The estimated future trophic level of the lake and its arms with this requirement for phosphorus removal is shown in Figure III-4 for Scenarios II, III, and V. Scenario II (the Atlanta Region Areawide Wastewater Management Plan Scenario) is representative of adopted areawide planning; Scenario III (the 201 Facilities Plan Scenario) is representative of local planning which has occurred thus far in the Basin; and Scenario V (the Minimum Federal Action Scenario) assumes no further federal funding. The analysis assumes no increase in the existing state of enforcement of nonpoint source controls.

A comparison of Figure III-4 with Figure III-3 shows that the quality of Lake Jackson is expected to improve substantially with the currently required effluent limitation of not more than 1.0 mg/l phosphorus in new discharges. The Alcovy River arm could be expected to improve to conditions approximating those now existing in Lake Allatoona; the South/Yellow arm could be expected to improve to conditions resembling those now existing in Lake Jackson overall; and the entire lake could be expected to improve to conditions somewhat better than those which now exist in Lake Blackshear. The lake would improve but continue to exhibit some adverse impacts.

PRESENT STATUS OF GEORGIA LAKES

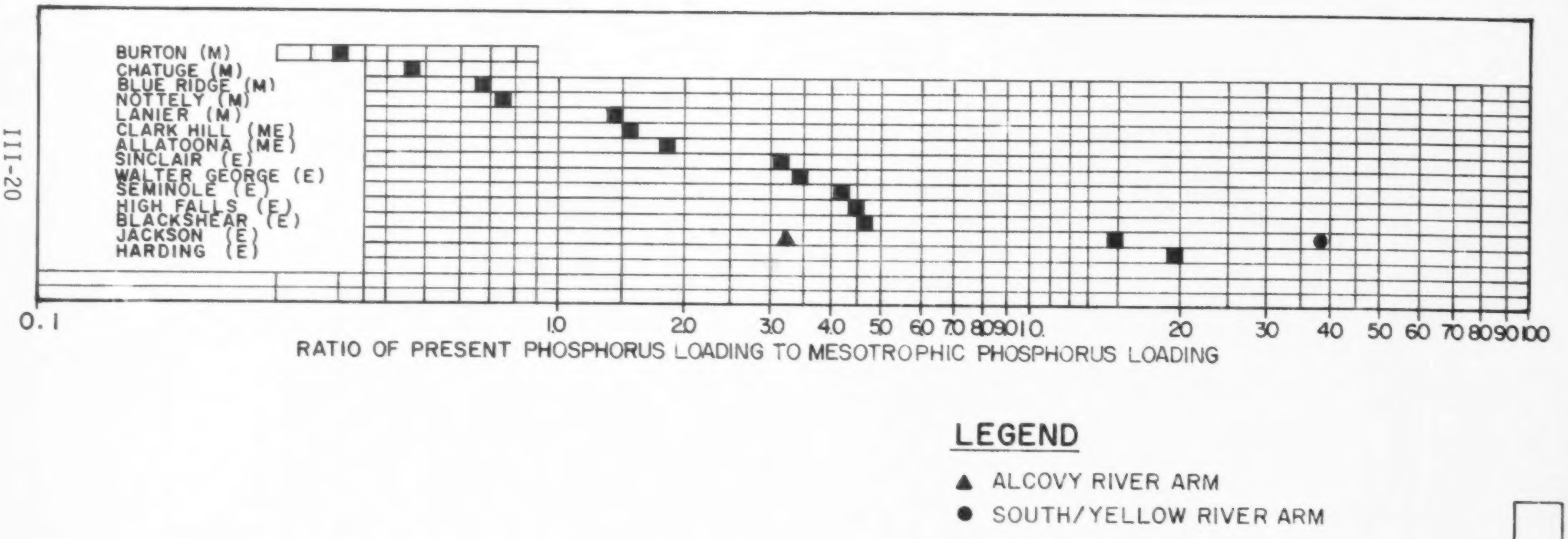


FIGURE III-3

ESTIMATED FUTURE TROPHIC LEVEL OF LAKE JACKSON WITH NOT MORE THAN 1.0 mg/L TOTAL PHOSPHOROUS IN NEW DISCHARGES

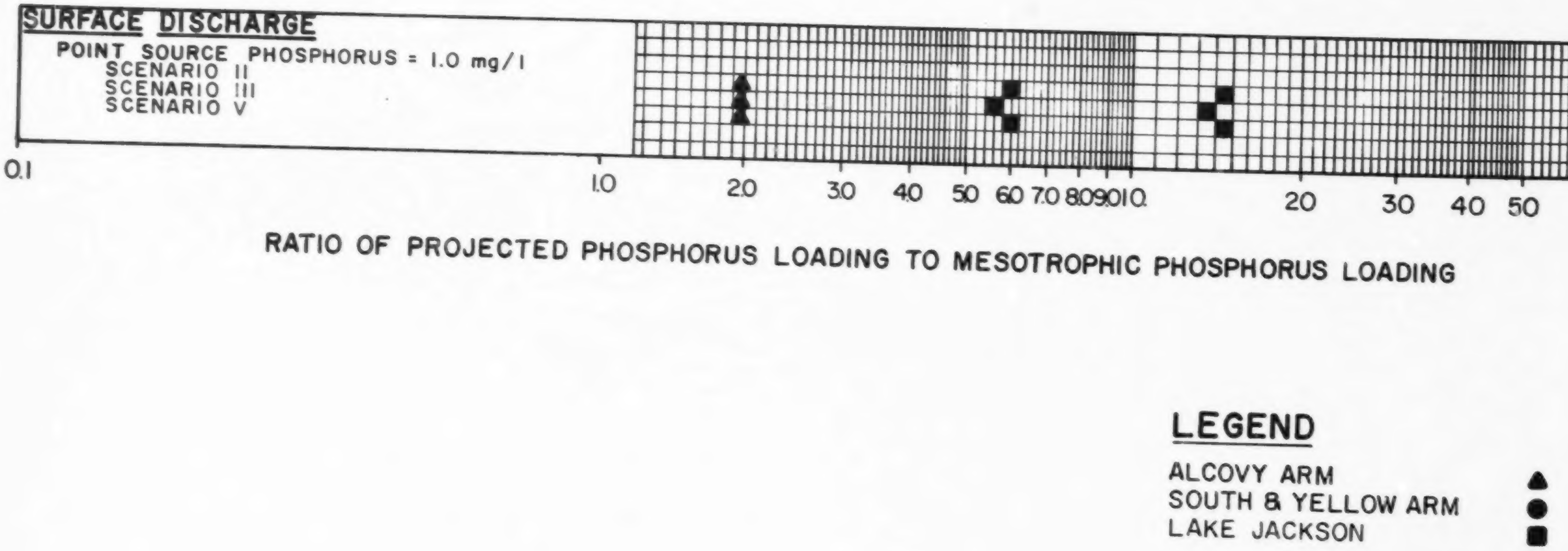


FIGURE III-4

F. SUMMARY OF WATER QUALITY INVESTIGATIONS

- Currently required effluent limitations are expected to ensure maintenance of the dissolved oxygen standard in the Yellow River Sub-basin under all planning scenarios except the Basin Plan and the Minimum Federal Action Scenarios, both of which are unlikely to occur.

- Water quality conditions in Lake Jackson will improve with implementation of currently required effluent limitations. However,the lake will continue to exhibit some adverse impacts.

- Lake Jackson can be made to be phosphorus limited; that is, its state of enrichment may be controlled by limiting phosphorus loadings.

- Most of the phosphorus input to Lake Jackson presently comes from point sources. Although the percentage of phosphorus contributed by these sources will decline with present planning, point source discharges will continue to supply the greatest portion of the phosphorus input to the lake under any of the planning scenarios examined.

IV. ALTERNATIVE MANAGEMENT STRATEGIES

CHAPTER IV

ALTERNATIVE MANAGEMENT STRATEGIES

A. RATIONALE FOR ALTERNATIVES DEVELOPMENT

Evaluation of the six planning scenarios indicated that water quality in the Yellow River Sub-basin would probably not be a problem under any of the scenarios considered likely to occur. However, each of the scenarios would contribute substantial nitrogen and phosphorus loadings to Lake Jackson. Although the lake could be expected to improve substantially from its present condition, some adverse effects would continue.

Lake Jackson is presently experiencing high biological productivity resulting in substantial algae productivity and fluctuating dissolved oxygen concentrations. Past studies have shown that this enrichment can likely be controlled by limiting the amount of phosphorus which the lake receives from its tributaries. By limiting this essential nutrient, biological productivity is likewise limited. Further, phosphorus is usually the nutrient least expensive to remove. Therefore, the development of alternative water quality management strategies emphasized reduction of the phosphorus load to Lake Jackson. Since the bulk of this phosphorus input presently comes from point sources and will continue to do so even with a high level of treatment (phosphorus removal to 1 mg/l), the strategies stressed modification of these discharges.

B. NONPOINT SOURCE CONTROL SYSTEMS

The development of alternative management strategies did not stress nonpoint source controls for two primary reasons:

1. Approximately two-thirds of the total phosphorus input to Lake Jackson in the year 2000 will come from point sources, and,
2. Regulations for extensive nonpoint source control either presently exist in the Upper Ocmulgee Basin, in the form of state and local laws and ordinances, or have been recommended for implementation by the Atlanta Regional Areawide or the State Areawide Water Quality Management 208 Plans.

Two levels of nonpoint source control were considered, however:

1. Continuation of the present state of enforcement of existing laws and ordinances governing nonpoint sources, and,
2. Stricter enforcement of existing laws and ordinances and implementation of the recommendations of the Atlanta Region and Statewide 208 Plans.

1. Continuation of Present Enforcement Practices

Existing nonpoint source loads estimated by the EIS represent the present level of enforcement of local nonpoint control laws and ordinances. Due to the dispersed nature of nonpoint sources and the developing state of the art for their control, it is doubtful that major reductions of nonpoint pollutants can be achieved by the end of the study period (year 2000). However, it is anticipated that expanded knowledge of nonpoint source control techniques combined with more stringent local-enforcement could bring about a worthwhile reduction of future nonpoint loads. Maintenance of the present state of enforcement of nonpoint controls has thus been considered to represent the upper limit (i.e., worst case) of nonpoint emissions investigated by the EIS.

2. Stricter Enforcement Practices

Stricter enforcement of existing nonpoint control laws and ordinances and implementation of the recommendations of the Atlanta Region and Statewide 208 Plans were assumed -- for purposes of evaluation -- to bring about an estimated ten percent reduction in nonpoint source emissions. Such a reduction is considered feasible on the basis of adopting the present Alcovy River Sub-basin phosphorus loading rate (pounds per acre per year) as a performance target for the entire Upper Ocmulgee River Basin.

C. POINT SOURCE CONTROL ALTERNATIVES

Seven alternative management strategies for reducing point source phosphorus were developed. These include various means of wastewater treatment to reduce effluent phosphorus levels; a ban on the sale of phosphate-based detergents and cleaning compounds; diversion of wastewater to the Chattahoochee River; discharge of wastewater below Lake Jackson; and land application of treated wastewater. The seven alternative point source strategies are outlined in Table IV-1 and further summarized below.

Alternative 1 - Two-stage lime treatment. All wastewater discharged within UORB secondary treatment utilizing the activated sludge process (with sufficient detention time for adequate nitrification where necessary), two-stage lime treatment for phosphorus removal, and post-aeration.

Alternative 2 - Two-stage lime treatment and filtration. All wastewater discharged with UORB receive secondary treatment utilizing the activated sludge process (with sufficient detention time for adequate nitrification where needed), two-stage lime treatment and filtration for phosphorus removal and post-aeration.

TABLE IV-1
ALTERNATIVE POINT SOURCE STRATEGIES

Alternative Number	Process Description (Phosphorus Removal)	(mg/l) TP
1	Two stage lime treatment	0.5
2	Two stage lime treatment, filtration	0.1
3	Ferric addition to primary filtration	1.0
4	Alternative 3, plus domestic ban on phosphate detergents	0.3
5	Effluents from areas receiving water supply from Chattahoochee River rediverted to Chattahoochee: remaining effluents per Alternative 3	1.0
6	Effluents from areas receiving water supply from Chattahoochee River diverted to Ocmulgee River below Lake Jackson remaining effluents per Alternative 3	1.0
7	Land application	0

Alternative 3 - Ferric chloride addition. In this alternative, ferric chloride (a coagulant) is added to the primary sedimentation basins of all discharges for phosphorus removal, secondary treatment is applied utilizing the activated sludge process with sufficient detention time for adequate nitrification where needed, followed by filtration and post-aeration.

Alternative 4 - Phosphate ban. This alternative proposes a ban on the sale of phosphate-based domestic detergents and cleaning compounds in addition to the treatment processes of Alternative 3.

Alternative 5 - Rediversion to the Chattahoochee River. In this alternative, that portion of wastewater discharged within the Upper Ocmulgee Basin, but originally drawn from the Chattahoochee River as water supply, is provided advanced secondary treatment (15 mg/l 5-day BOD, 4 mg/l ammonia nitrogen, 5 mg/l dissolved oxygen) and rediverted to the Chattahoochee. The remainder is treated as in Alternative 3 and discharged within the Upper Ocmulgee Basin.

Alternative 6 - Lake Jackson bypass. Similar to Alternative 5 except that wastewater generated from "imported" water is provided with secondary treatment and diverted around Lake Jackson.

Alternative 7 - All wastewater discharges within the Upper Ocmulgee Basin are at least provided with pre-application treatment equivalent to that achieved by aerated lagoons and applied to the land at approved sites.

The development of this alternative included a preliminary evaluation of the Upper Ocmulgee Basin for potential land application sites. In this survey, spray irrigation was assumed. However, rapid infiltration or overland flow may be preferred on a case-by-case basis.

Potential sites were identified using an overlay technique to eliminate unsuitable tracts. In this manner, areas of unsuitable soils, excessively steep slopes, and proximity to incompatible land uses were eliminated. In addition, special use areas such as historical, cultural, archaeological, and environmentally sensitive sites were eliminated.

Forty-one potential pasture and cropland spray irrigation sites were identified. These sites are summarized in Table IV-2 and generally shown in Figure IV-1. These sites represent only a preliminary survey of the Basin and in no way should be regarded as recommended or fully evaluated spray sites.

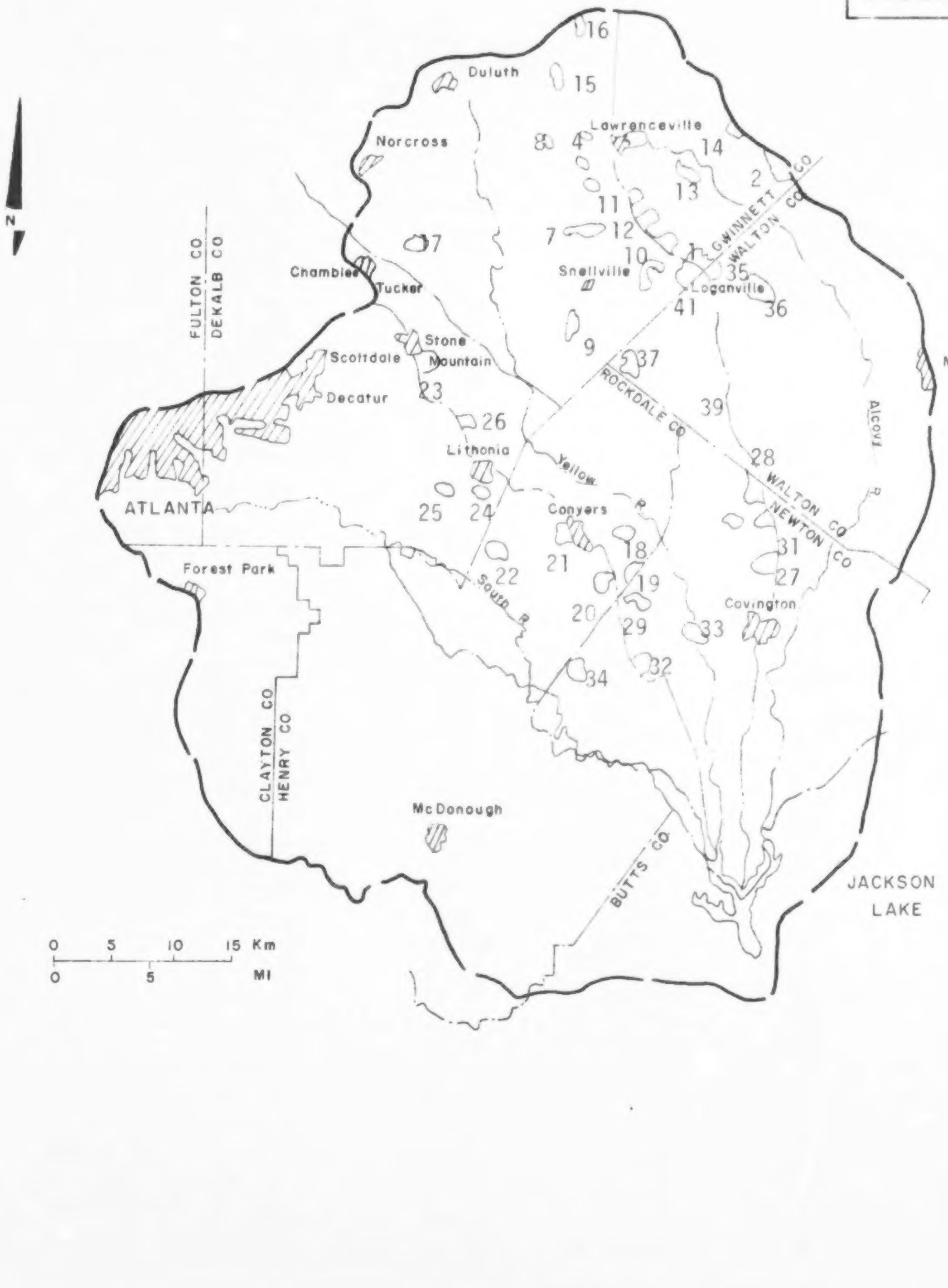
D. APPLICATION OF THE MANAGEMENT STRATEGIES TO SCENARIOS

The management strategies were applied only to Scenarios II, III, and V. Scenario II (the Atlanta Region Areawide Wastewater Management Plan Scenario) was chosen since it is representative of adopted areawide planning. Scenario III (the 201 Facilities Plan Scenario) was chosen as representative of planning which has occurred thus far in the Basin. Finally, Scenario V (the Minimal Federal Action Scenario) was chosen since it represents the "no-action" Plan. Tables III-3 and III-6A summarize the flow conditions by facility (plant) for each sub-basin. Management strategies for the scenarios are applied only to plants which discharge into the Basin, as shown in aforementioned tables. A map showing the location of the various facilities listed in Tables III-3 and III-6 is shown in Figure IV-2 (a-c).

TABLE IV-2
POTENTIAL PASTURE AND CROPLAND SPRAY IRRIGATION SITES
UPPER OCMULGEE BASIN

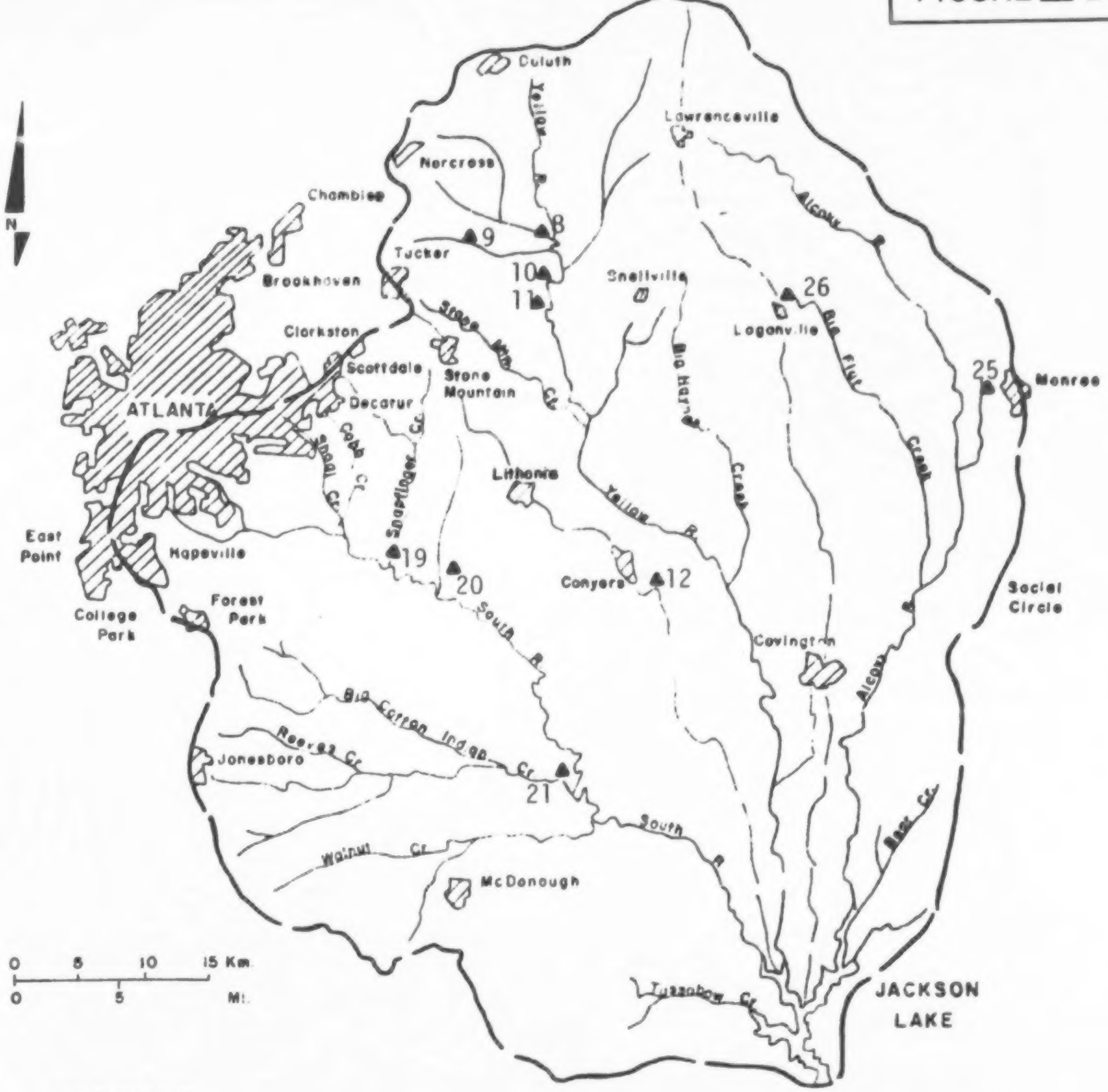
NUMBER	(ACRES)	COUNTY	SUB-BASIN	CONSTRAINTS
1	840	Gwinnett	Alcovy	Interbasin Transfer
2	1320	Gwinnett	Alcovy	Interbasin Transfer
3	770	Gwinnett	Alcovy	Interbasin Transfer
4	450	Gwinnett	Yellow	Small Tract
5	220	Gwinnett	Yellow	Small Tract
6	160	Gwinnett	Yellow	Small Tract
7	780	Gwinnett	Yellow	Proximity to Urban Land Use
8	400	Gwinnett	Yellow	Small Tract
9	410	Gwinnett	Yellow	Small Tract
10	480	Gwinnett	Alcovy	Interbasin Transfer
11	330	Gwinnett	Alcovy	Interbasin Transfer
12	290	Gwinnett	Alcovy	Interbasin Transfer
13	800	Gwinnett	Alcovy	Interbasin Transfer
14	380	Gwinnett	Alcovy	Interbasin Transfer
15	330	Gwinnett	Yellow	Small Tract
16	400	Gwinnett	Yellow	Small Tract
17	190	Gwinnett	Yellow	Archaeological Site, Small Tract
18	400	Rockdale	Yellow	None
19	150	Rockdale	Yellow	Small Tract
20	1240	Rockdale	South	Proximity to Urban Land Use Interbasin Transfer
21	630	Rockdale	South	Proximity to Urban Land Use Interbasin Transfer
22	1640	Rockdale	South	Interbasin Transfer
23	650	DeKalb	Yellow	None
24	300	DeKalb	South	Interbasin Transfer
25	80	DeKalb	South	Interbasin Transfer, Small Tract
26	230	DeKalb	Yellow	Small Tract
27	430	Newton	Yellow	None
28	930	Newton	Yellow	None
29	1330	Newton	Yellow	Proximity to Urban Land Use
30	130	Newton	Yellow	Small Tract
32	270	Newton	Yellow	Small Tract
33	220	Newton	Yellow	Small Tract
34	810	Newton	South	Proximity to Urban Land Use
35	670	Walton	Alcovy	Lack of Jurisdiction
36	1820	Walton	Alcovy	Lack of Jurisdiction
37	1100	Walton	Yellow	Lack of Jurisdiction
38	720	Walton	Yellow	Lack of Jurisdiction
39	500	Walton	Yellow	Lack of Jurisdiction
40	1680	Gwinnett	Yellow	None
41	1100	Gwinnett	Yellow	Historical Site

FIGURE IV-1


N
16
Duluth
15
Norcross
8
4
Lawrenceville
14
2
13
11
12
7
10
1
GWINNETT CO
WALTON CO
17
Chamblee
Tucker
Snellville
35
Loganville
41
36
FULTON CO
DEKALB CO
Stone Mountain
Scottdale
9
37
Monroe
Decatur
23
ROCKDALE CO
39
26
Alcovy R
Lithonia
28
Yellow R
WALTON CO
NEWTON CO
ATLANTA
25
24
Conyers
18
31
27
Forest Park
22
21
19
South R
20
Covington
29
33
34
32
CLAYTON CO
HENRY CO
McDonough
BUTTS CO
JACKSON LAKE
0
5
10
15 Km
0
5
MI

LOCATION OF POTENTIAL PASTURE AND CROPLAND SPRAY IRRIGATION SITES IN THE UPPER OCMULGEE BASIN

FIGURE IV-2a

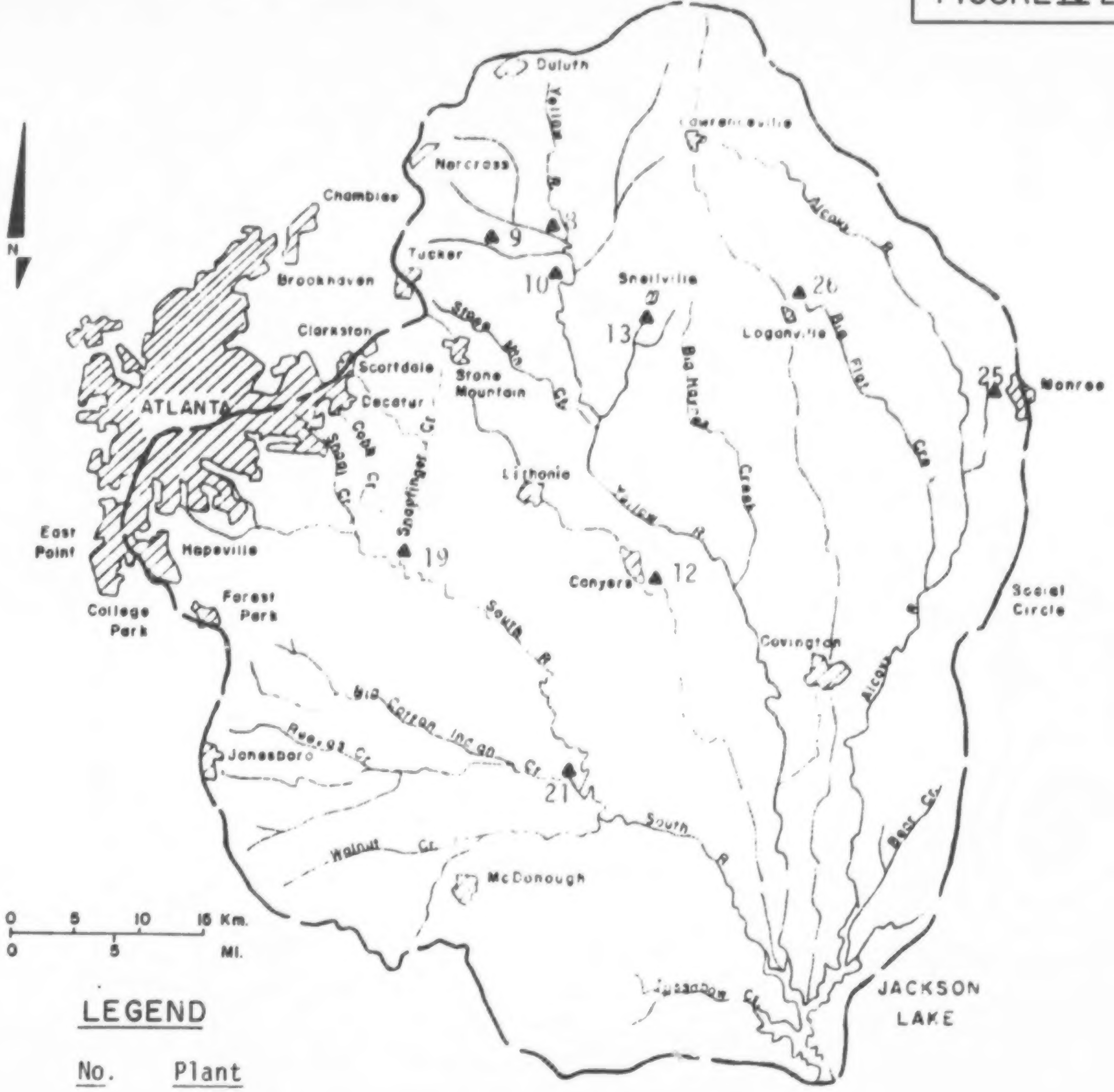

N
Duluth
Yellow R.
Lawrenceville
Norcross
Chamblee
Alcovy R.
9
8
Tucker
10
11
Brookhaven
Snellville
26
Loganville
Clarkston
Stone Mtn. Cr.
Big Haynes Cr.
Big Flat Creek
25
Monroe
Scottdale
Stone Mountain
Decatur
ATLANTA
Cobb Cr.
Snapfinger Cr.
Shoal Cr.
Lithonia
Yellow R.
Creek
East Point
Hapeville
19
20
Conyers
12
Social Circle
College Park
Forest Park
South R.
Covington
Alcovy R.
Big Cotton Indian Cr.
Reeves Cr.
Jonesboro
21
Bear Cr.
South R.
Walnut Cr.
McDonough
0 5 10 15 Km.
0 5 Mi.
Tussahaw Cr.
JACKSON LAKE

LEGEND

No.	Plant
8	Beaver Ruin
9	Jackson Creek
10	Yellow/Sweet
11	Middle Yellow
12	Conyers
19	Snapfinger
20	Pole Bridge
21	Cotton Indian
25	Monroe Pond #1&2
26	Loganville

LOCATION
POINT SOURCE DISCHARGES
SCENARIO II

FIGURE IV-2b

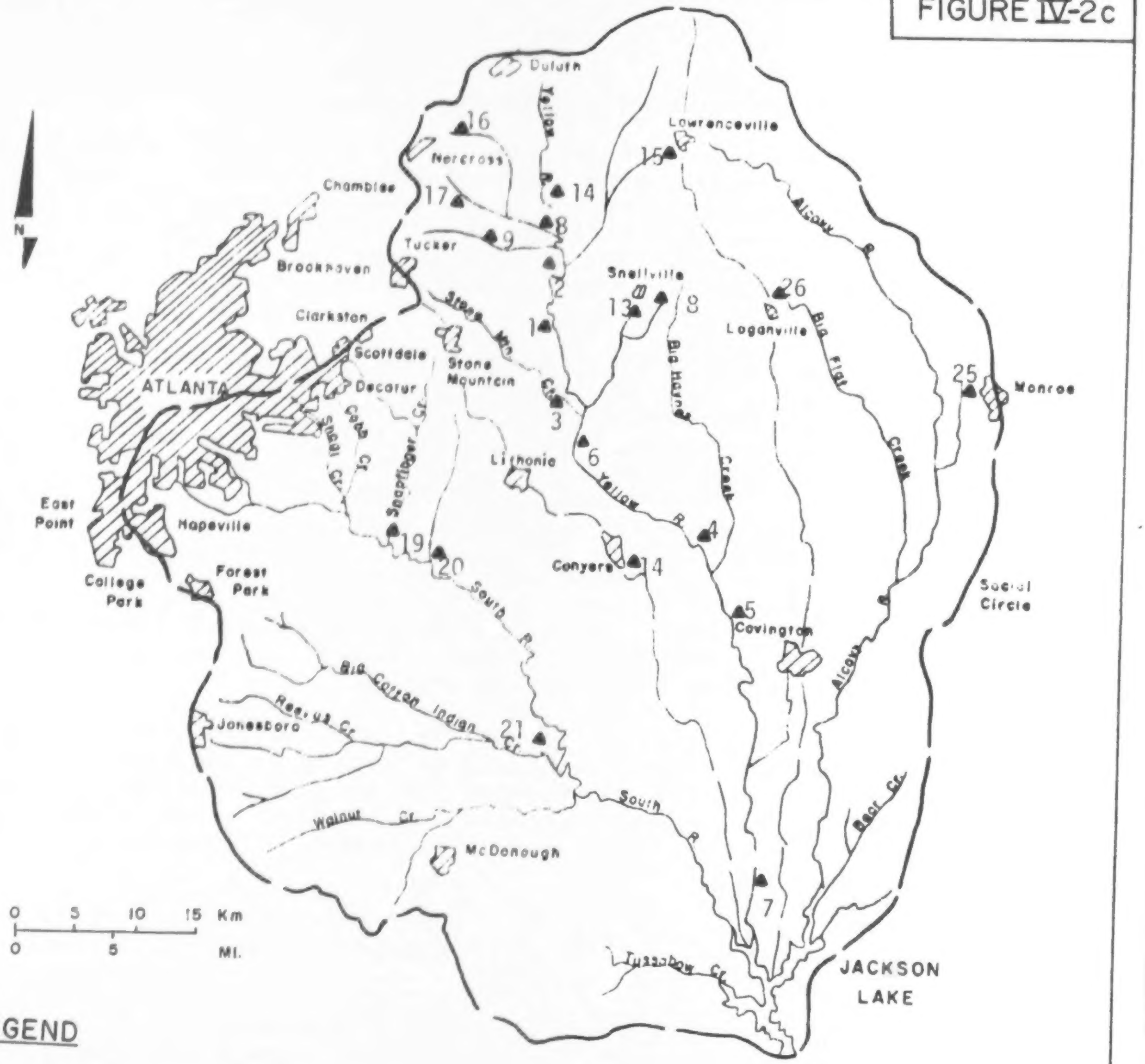

Duluth
Yellow R.
Lawrenceville
Norcross
Chamblee
8
9
Tucker
10
Brookhaven
Snellville
13
26
Loganville
Clarkston
Scottdale
Stone Mountain
Stone Mtn. Cr.
Decatur
ATLANTA
Cobb Cr.
Shoal Cr.
Snapfinger Cr.
Big Haynes Creek
Big Flat Cr.
Alcovy R.
25
Monroe
Lithonia
Yellow R.
East Point
Hapeville
19
12
Conyers
Social Circle
College Park
Forest Park
South R.
Covington
Alcovy R.
Big Cotton Indian Cr.
Reeves Cr.
Jonesboro
21
South R.
Bear Cr.
Walnut Cr.
McDonough
0 5 10 15 Km.
0 5 Mi.
N
Tussahaw Cr.
JACKSON LAKE

LEGEND

No.	Plant
8	Beaver Ruin
9	Jackson Creek
10	Yellow/Sweet
12	Conyers
13	Snellville
19	Snapfinger Creek
21	Cotton Indian
25	Monroe Pond #1&2
26	Loganville

LOCATION
POINT SOURCE DISCHARGES
SCENARIO III

FIGURE IV-2c


N
Duluth
Yellow R.
16
Norcross
Lawrenceville
15
14
Chamblee
17
8
9
Tucker
Brookhaven
Alcovy R.
26
Snellville
13
8
2
Loganville
Clarkston
Stone Mtn. Cr.
1
Scottdale
Stone Mountain
Big Haynes Creek
Big Flat Creek
25
Monroe
ATLANTA
Decatur
Cobb Cr.
3
Shoal Cr.
Snapfinger Cr.
6
Lithonia
Yellow R.
East Point
Hapeville
19
4
20
Conyers
14
College Park
Forest Park
South R.
5
Social Circle
Covington
Alcovy R.
Big Cotton Indian
Rex, Mud Cr.
Jonesboro
21
Cr.
South R.
Walnut Cr.
McDonough
Bear Cr.
7
0 5 10 15 Km
0 5 Mi.
Tussahaw Cr.
JACKSON LAKE

LEGEND

No.	Plant
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	Beaver Ruin
9	Jackson Creek
12	Conyers
13	Snellville
14	Northwood
15	Lawrenceville
16	Hopkins
17	Indian Trail Villa
18	Summit Chase
19	Snapfinger
20	Pole Bridge
21	Cotton Indian
25	Monroe Pond # 1&2
26	Loganville

LOCATION
POINT SOURCE DISCHARGES
SCENARIO V

1. Costs of Alternative Management Strategies

Present worth costs for implementing each of the alternative management strategies under Scenarios II, III, and V were developed based upon cost curves prepared by EPA and the U.S. Army Corps of Engineers (Bulletin Nos. PB-244-417, EPA-430/9-75- 003, and EPA-430/9-75-016). These cost curves were updated using an EPA sewage treatment plant construction index of 279.1 to reflect July, 1978 conditions.

Present worth costs include capital and operation and maintenance (O&M) costs required to meet the effluent limitation associated with each alternative. Capital costs include the costs for construction of new treatment facilities and transmission lines as well as expansion and upgrading of existing (or presently approved) facilities. Construction of new facilities and/or upgrading or other modification of existing or approved plants was assumed to occur in three construction stages--1980, 1990, and 1995. O&M costs were assumed to increase linearly between construction stages. Salvage values were credited using straight line depreciation assuming a twenty-year design life for wastewater treatment facilities and a fifty-year design life for transmission and distribution piping.

Land acquisition costs were included for Alternative 7 only. The costs of this alternative also generally reflect application of the most recent EPA regulations for land application. Allowable credits for annual appreciation of land value throughout the life of the project and allowances for potential crop recovery were not included.

Further information concerning pertinent assumptions used in the economic evaluations of the alternatives is presented in section C.1 of Chapter V of this report.

The present worth costs of alternative management strategies 1 through 7 as applied to Scenarios II, III, and V are summarized in Table IV-3.

2. Impacts of Alternative Management Strategies on Lake Jackson

In Chapter III, a comparison was made of the present condition of Lake Jackson with thirteen other lakes in Georgia. Such a comparison is also valuable to illustrate the anticipated future condition of Lake Jackson under the various scenarios and alternatives studied. Simply stated, we know what Lake Jackson is like now with its present loading of phosphorus. We also know what several other Georgia lakes are like now; that is, we know not only their current condition but we are familiar with their appearance and their suitability for various uses. Which of these existing lakes would Lake Jackson be most likely to resemble in the year 2000 under various strategies of phosphorus removal?

TABLE IV-3
PRESENT WORTH COSTS OF ALTERNATIVE MANAGEMENT STRATEGIES*

ALTERNATIVE	SUB-BASIN	SCENARIO II			SCENARIO III			SCENARIO V		
		P.W. ($10^6)	Annual Equivalent ($10^6/yr.)	Cost Vol. (¢/1000 gal)	P.W. ($10^6)	Annual Equivalent ($10^6/yr.)	Cost Vol. (¢/1000 gal)	P.W. ($10^6)	Annual Equivalent ($10^6/yr.)	Cost Vol. (¢/1000 gal)
1	South R.	65.57	5.57	24	37.51	3.22	19	56.22	4.78	24
	Yellow R.	54.63	4.64	36	45.72	3.88	38	122.21	10.38	59
	Alcovy R.	13.95	1.18	91	13.95	1.18	91	13.95	1.18	91
	UORB	134.15	11.37	32	97.18	8.28	30	192.38	16.34	43
2	South R.	74.21	6.30	28	43.86	3.72	21	63.89	5.42	28
	Yellow R.	61.64	5.23	40	51.69	4.39	42	136.82	11.62	66
	Alcovy R.	15.38	1.31	101	15.38	1.31	101	15.38	1.31	101
	UORB	151.23	12.84	36	110.93	9.40	34	216.09	18.35	48
3 & 4	South R.	60.11	5.11	22	35.59	3.02	17	51.43	4.36	22
	Yellow R.	47.05	3.99	31	38.05	3.23	31	107.27	9.11	52
	Alcovy R.	12.61	1.07	82	12.61	1.07	82	12.61	1.07	82
	UORB	119.77	10.17	28	86.25	7.32	27	171.32	14.54	39
5	South R.	75.59	6.42	28	51.88	4.41	25	67.20	5.70	29
	Yellow R.	51.96	4.41	34	45.91	3.90	38	105.29	8.49	48
	Alcovy R.	12.61	1.07	82	12.61	1.07	82	12.61	1.07	82
	UORB	140.16	11.90	33	110.40	9.38	33	185.10	15.26	41
6	South R.	87.64	7.44	33	68.15	5.79	33	80.75	6.85	35
	Yellow R.	58.17	4.94	38	55.32	4.70	45	114.11	9.63	55
	Alcovy	12.61	1.07	82	12.61	1.07	82	12.61	1.07	82
	UORB	158.42	13.48	37	136.08	11.56	41	207.47	17.55	46
7	South R.	67.99	5.77	26	47.44	4.03	23	57.24	4.86	25
	Yellow R.	50.18	4.26	33	40.64	3.45	33	89.07	7.56	43
	Alcovy R.	7.98	0.68	52	7.98	0.68	52	7.98	0.68	52
	UORB	126.15	10.71	29	96.06	8.16	28	154.29	13.10	31

*Costs shown are based upon an EPA sewage treatment plant construction index of 279.1 which represents July 1978 conditions in Atlanta, Georgia.

Figure IV-3 shows the anticipated future condition of Lake Jackson and its arms under each management alternative for Scenarios II, III, and V. In addition, the anticipated future condition assuming no requirement for phosphorus removal is shown. For comparison purposes, the present condition of other Georgia lakes is shown in the lower portion of the figure.

There are several important points to note when looking at Figure IV-3. First, note that the abscissa (horizontal number line) shows a logarithmic scale and not a straight-line progression. The magnitude of the enrichment problem in the lakes increases dramatically from left to right. Second, note the present condition of Lake Jackson with respect to the comparison lakes. Third, note that under any alternative strategy, Lake Jackson as a whole would continue to exhibit some adverse conditions, although it would be much improved from its present condition. Remember the logarithmic scale when making this comparison. Finally, compare the anticipated future condition of Lake Jackson under the various scenarios and alternatives with the present condition of the comparison lakes.

3. Constraints to Implementation of Alternative Strategies

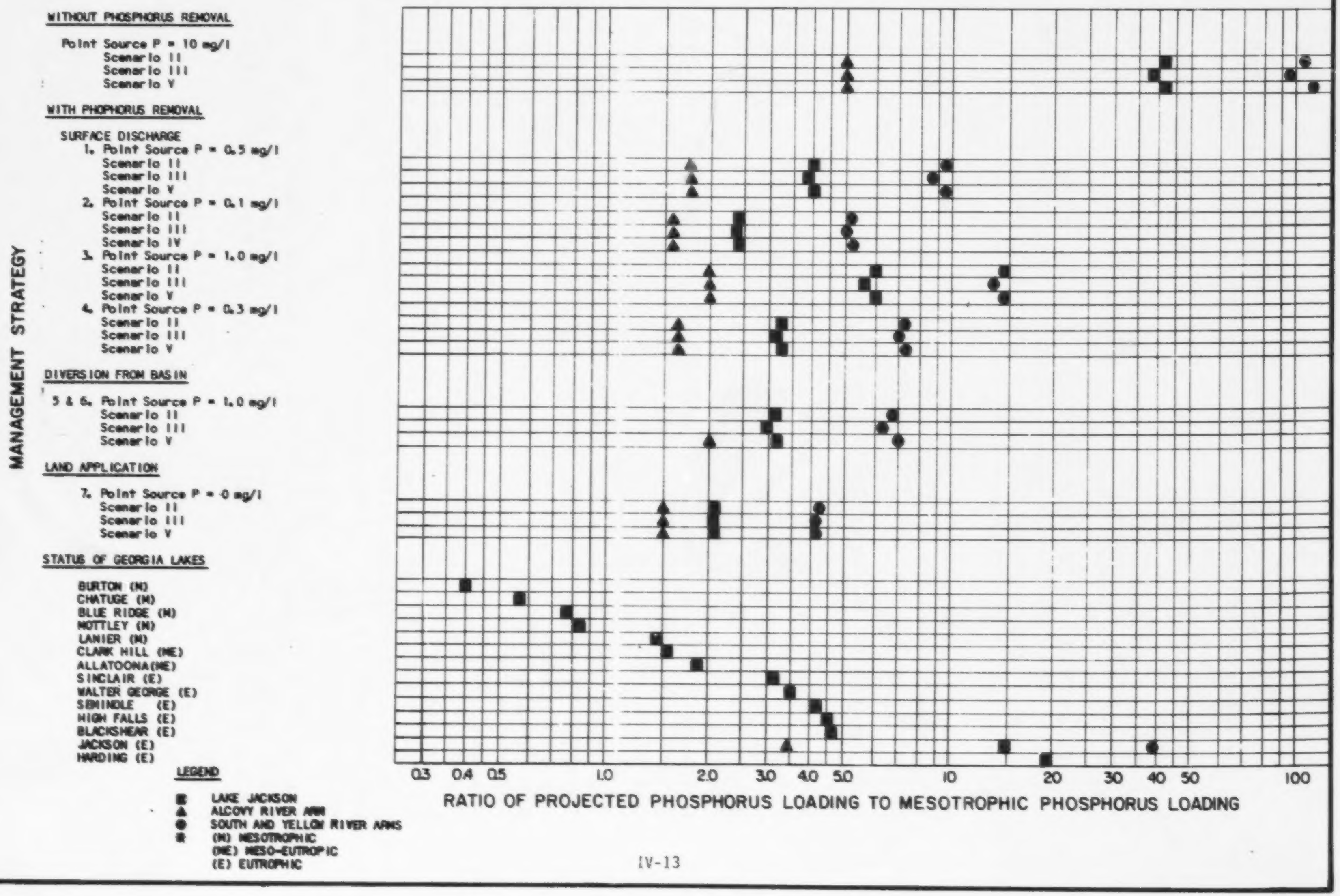
a. Technical - Attainment of unit nonpoint source phosphorus loads in the South and Yellow River sub-basins which are equal to those now existing in the Alcovy River Sub-basin may not be technically achievable. Portions of the South and Yellow sub-basins are highly urbanized, making implementation of stringent nonpoint source controls very costly. Further development of the state of the art for nonpoint source control technology over the course of the study period may be limited.

b. Legal - Rights-of-way for transmission lines required under Alternatives 5 and 6 would cross several jurisdictional boundaries. Interagency agreements would be needed to secure these rights-of-way. This same constraint may be realized to a more limited extent in the acquisition of land for land application sites and associated transmission line rights-of-way under Alternative 7.

c. Economic - Implementation of nonpoint source controls, particularly to the degree necessary to attain the equivalent of Alcovy River Sub-basin loading rates, may require allocation of significant resources. Nonstructural controls such as local laws and ordinances have little or no cost associated with them. However, their associated structural controls may have significant costs attached to them. For example, an ordinance requiring that subdivisions provide on-site detention ponds and overflow structures and outlets is nonstructural. However, the resulting system of ponds and appurtenant facilities is structural. The costs of such systems are normally passed on to the consumer.

FIGURE IV-3

COMPARISON OF FUTURE SCENARIO CONDITIONS IN LAKE JACKSON WITH THAT NOW EXISTING IN OTHER GEORGIA LAKES



d. Socio-Political - Primary socio-political constraints to implementation of the alternative strategies are:

- Exercise of eminent domain is often opposed by property owners.
- A ban on the sale of phosphate-based detergents and cleaning compounds may not be publicly acceptable.
- Diversion of effluent to the Chattahoochee River (in addition to the on-going Three Rivers project) or to the Lower Ocmulgee Basin (below the Lloyd Shoals Dam) may not be acceptable to the local citizenry.
- Local land use controls oriented toward nonpoint source load reductions may not be acceptable to large property owners and/or growth-oriented jurisdictions.

E. SUMMARY OF ALTERNATIVES EVALUATION

General conclusions of the alternatives evaluation process and comparison of Georgia lakes are readily seen. Diversion of wastewaters from the Upper Ocmulgee Basin -- whether to the Chattahoochee River or Lower Ocmulgee Basin -- would result in somewhat better future conditions in Lake Jackson than now projected with current planning (Alternative 3). However, both diversion schemes would cost significantly more than current planning.

The resultant future condition of Lake Jackson is projected to improve in proportion to the degree of point source phosphorus removal under Alternatives 1, 2, 3, and 4. However, the costs of these alternatives rise as the amount of phosphorus removal increases. A conspicuous exception to this appears to be Alternative 7, the land application alternative. In the Yellow River and Alcovy River sub-basins, this alternative appears to be economically competitive with current planning requirements. In the South River Sub-basin it will likely be more expensive. However, Alternative 7 is projected to result in the best future water quality in Lake Jackson of any of the alternatives examined.

Table IV-4 summarizes the present worth costs of the alternative management strategies and anticipated resultant conditions in Lake Jackson with respect to other lakes in Georgia.

TABLE IV-4
SUMMARY OF ALTERNATIVE MANAGEMENT STRATEGY EVALUATION

		SCENARIO II		SCENARIO III		SCENARIO V	
ALTERNATIVE	SUB-BASIN	COST	REFERENCE LAKE(S)	COST	REFERENCE LAKE(S)	COST	REFERENCE LAKE(S)
1	South R.	72	Blackshear/Jackson	42	Blackshear/Jackson	62	Blackshear/Jackson
Treatment	Yellow R.	64	Blackshear/Jackson	57	Blackshear/Jackson	139	Blackshear/Jackson
0.5 mg/l	Alcovy R.	15	Clark Hill/Allatoona	15	Clark Hill/Allatoona	15	Clark Hill
Phosphorus	UORB	151	George/Seminole	114	George, Alcovy Arm	216	Allatoona/Sinclair
2	South R.	82	Blackshear	48	Blackshear, High Falls/ Blackshear	70	Blackshear
Treatment 0.1 mg/l	Yellow R.	72	Blackshear	63	Blackshear, High Falls/ Blackshear	155	Blackshear
Phosphorus	Alcovy R.	17	Clark Hill	17	Clark Hill	17	Clark Hill
	UROB	171	Allatoona/Sinclair	128	Alltoona/Sinclair	242	Alltoona/Sinclair
3	South R.	66	Jackson	39	Blackshear/Jackson	57	Jackson
Current	Yellow R.	56	Jackson	48	Blackshear/Jackson	122	Jackson
1.0 mg/l	Alcovy R.	14	Allatoona	14	Allatoona	14	Allatoona
Phosphorus	UORB	136	Blackshear	101	Blackshear	193	Blackshear
4 Phosphorus	South R.	66	Blackshear/Jackson Blackshear	39	Blackshear	57	Blackshear/Jackson
Ban 0.3 mg/l	Yellow R.	56	Blackshear/Jackson	48	Blackshear	122	Blackshear/Jackson Blackshear
Phosphorus	Alcovy R.	14	Clark Hill/Allatoona	14	Clark Hill/Allatoona	14	Clark Hill/Allatoona
	UROB	136	Sinclair	101	Sinclair	193	Sinclair
5	South R.	83	Blackshear	57	Blackshear	74	Blackshear
Diversion	Yellow R.	61	Blachshear	54	Blackshear	118	Blackshear
to	Alcovy R.	14	Allatoona	14	Allatoona	14	Allatoona
Chattahoochee	UROB	158	Sinclair	125	Sinclair	206	Sinclair
6	South R.	96	Blackshear	75	Blackshear	89	Blackshear
Bypass	Yellow R.	68	Blackshear	64	Blackshear	128	Blackshear
Lake	Alcovy R.	14	Allatoona	14	Allatoona	14	Allatoona
Jackson	UORB	178	Sinclair	153	Sinclair	231	Sinclair
7	South R.	75	Seminole	52	Seminole, George/ Seminole	63	Seminole, George/ Seminole
Land	Yellow R.	55	Seminole	45	Seminole, George/ Seminole	98	Seminole, George/ Seminole
Application	Alcovy R.	9	Clark Hill	9	Clark Hill	9	Clark Hill
	UORB	139	Allatoona	106	Allatoona	170	Allatoona

V. THE RECOMMENDED STRATEGY

CHAPTER V

THE RECOMMENDED MANAGEMENT STRATEGY

A. STRATEGY OVERVIEW

The First Edition, Upper Ocmulgee River Basin Water Quality Management Plan shall be updated so that the effluent limits it establishes are those required to attain applicable water quality standards in the Basin. In addition, the overall water quality management strategy for the Basin must include the elements of the strategy developed in this EIS in order to receive EPA approval.

The water quality management strategy selected in this EIS for point sources involves the utilization of land application of wastewater whenever economically competitive and environmentally suitable. The selected strategy includes reduction in non-point source loadings through strict enforcement of existing laws and ordinances as well as implementation of the recommendations of the Atlanta Region and Statewide 208 Water Quality Management Plans.

In order to implement the selected strategy, the State of Georgia and the Environmental Protection Agency will require applicants for any NPDES permit for a new discharge or applicants for a new Step II construction grant to provide documentation of a rigorous and thorough evaluation of land application techniques and costs, and to select this method of wastewater management whenever economically competitive and environmentally sound. This policy will apply to all new treatment facilities including any new phased construction or expansion provided by 201 facilities plans already approved. For expansion of existing facilities, maximum integration of these facilities into a land application scheme must be compared with surface water discharge constraints.

For those proposed facilities which are federally funded, these analyses shall be performed using EPA's latest guidelines for designing, costing, and evaluating land treatment alternatives. Those which are not federally funded shall be evaluated using the most recent Georgia Environmental Protection Division guidelines. Wherever land treatment is determined to be economically competitive and environmentally acceptable, the EPA and/or the Georgia EPD will require its implementation for maximum benefit to Lake Jackson and downstream users, and to strive to meet the national goal of zero discharge.

The selected strategy also includes the requirement to perform detailed investigations of on-lot disposal systems in future facilities planning. Wherever feasible, such systems should be implemented to reduce the capacity requirements for regional systems. As part of this requirement, future facility planning will also be required to address institutional arrangements required for local management of such systems.

Rockdale County has proposed the construction of a reservoir on Big Haynes Creek for recreation and future water supply. The Atlanta Regional Commission is currently developing a watershed protection plan which is expected to be completed in March 1980. The development of this plan is a part of the areawide wastewater management continuing planning process. This plan will be included in the 1979 208 Plan Update report.

B. STRATEGY IMPACTS

1. Primary Impacts

Implementation of currently required effluent limitations in the Basin combined with the existing state of enforcement of nonpoint source controls would result in substantial improvement in the water quality of Lake Jackson by the year 2000. Conditions would likely improve to approximately those now existing in Lake Blackshear, an impoundment on the Flint River near Albany, Georgia. However, notwithstanding the current requirement for not more than 1.0 mg/l phosphorus in discharges within the Basin, approximately two-thirds of the projected phosphorus loading to Lake Jackson would be contributed by point sources. Implementation of the recommended control strategy would further reduce this point source loading to the lake. Combined with strict enforcement of existing laws and ordinances to achieve an approximate ten percent reduction in projected nonpoint loadings, the recommended action would likely improve the overall quality of Lake Jackson to resemble that of Lake Allatoona, a large impoundment on the Etowah River northwest of Atlanta. Conditions in the primary arms of the lake would be different, however. The Alcovy River arm would probably improve to a level of water quality approximating that now existing in Lake Lanier or Clark Hill Reservoir, while the South and Yellow River arms could be expected to improve to a level between that now existing in Lakes Walter George and Seminole. These projected impacts are shown in Figure IV-2.

In summary, the recommended action would cause the water quality of Lake Jackson and its arms to be greatly improved over existing conditions. Further, the recommended action would bring about substantial improvement in steam water quality from what is now projected to occur as a result of implementation of the currently required limitations since future discharges would be removed from surface waters.

2. Secondary Impacts

Secondary or induced impacts are those which will occur indirectly from implementation of the recommended strategy. These impacts must be examined on a case-by-case basis. Generally, however, the secondary impacts of land application in the Upper Ocmulgee Basin would be as follows:

a. Natural Environment: Atmospheric impacts may include changes in microclimate, local air quality, and local odor levels. Microclimatic changes may include increases in humidity and fog as well as temperature changes which would be noticeable at or near the land application site. Aerosols induced by operation of certain types of application systems, such as spray irrigation systems, may impact air quality in the vicinity of the site. Finally, odor producing constituents may be entrained in these aerosols. Each of these atmospheric impacts may be minimized, if not eliminated, by proper site selection and management techniques.

Impacts to terrestrial ecosystems may include disruption or destruction of wildlife habitat, primarily as the result of modification or clearing of the site, and changes in the physical and chemical makeup of the local soil matrix. On the other hand, land application systems can stimulate vegetative growth and increase animal forage. In addition, land application can create greenbelt areas useful to wildlife.

Land application can lower base stream flows below natural levels, because provision is not made for returning wastewater to the stream from which it was originally withdrawn. In some cases this might impact water supply, particularly during drought conditions.

Land application processes relieve waste loadings to surface waters and transfer these loadings to the soil matrix and groundwater. Excessive loadings may adversely affect groundwater quality and/or cause the effluent to migrate through the soil matrix and intercept surface streams.

b. Man-made Environment: Land application may require the relocation of residents at the application site. Changes in land values in the vicinity of the site may occur, and some tax revenue may be lost as a result of government purchase of land.

The estimated present worth costs of land application in the Upper Ocmulgee Basin are shown in Tables IV-3 and IV-4. On a Basin-wide basis, these costs are comparable to those estimated for the currently required treatment levels. However, all cost-effective analyses must be done on a case-by-case basis with individual assessment of economic impact to local jurisdictions and residents.

Costs which are not directly quantifiable are those associated with enforcing existing nonpoint source control ordinances, as well as those involved in implementing new cost controls to achieve an approximate ten percent reduction in nonpoint source loads. Additional planning and enforcement personnel would be required, and land development costs would increase. These costs would ultimately be passed on to local residents in the form of increased taxes and real estate costs.

Land application results in local alteration of land use. However, since approximately 75 percent of the total area of the Basin consists of forest and agricultural lands, these impacts are anticipated to be minimal overall.

Meaningful reductions in nonpoint source loads will probably require localized changes in land use patterns. Such changes are necessary to increase the quality, and decrease the quantity, of runoff by such management practices as decreasing impervious surface areas and gutter lengths, and establishing buffer zones along streams and waterways. These changes would not affect the overall location or density of new residential development.

Land application processes are generally less energy-intensive than conventional methods, since they transfer a portion of the process to the groundwater/soil/vegetative cover regime.

C. COMPATIBILITY OF THE RECOMMENDED STRATEGY WITH COMPLETED ACTIONS AND ON-GOING PLANNING

1. Point Source Controls

At the time Public Law 95-217 was enacted, it was the intent of Congress to encourage to the greatest extent possible the development of wastewater management policies consistent with the ecological principle that all waste materials should be returned to the cycles from which they were generated. Particular attention was to be given to wastewater management processes which renovate and reuse wastewater, as well as recycle organic matter and nutrients in a beneficial manner. Land treatment processes provide a method to meet these objectives.

Evaluation of land treatment in facilities planning has been mandatory under PL 92-500 since July 1, 1974. EPA construction grant regulations published in February, 1974, provided for coverage of land application techniques in facilities planning. Three land treatment techniques (slow rate, rapid infiltration, and overland flow) were included in the description of alternatives for best practicable treatment published in October, 1975. Since that time, the 1977 Amendments to the Clean Water Act have required that "waste treatment management plans and practices shall provide for the application of the best practicable waste treatment technology before any discharge into receiving waters, including reclaiming and recycling of water, and confined disposal of pollutants so they will not migrate to cause water or other environmental pollution...." Subsequent construction grant regulations emphasized that the EPA construction grant program will include thorough consideration of land treatment as compared to conventional treatment and discharge to surface waters. Specific changes included in these regulations which, on a case-by-case basis, may now cause land treatment to be more attractive than before are:

(1) Revised guidance for assessing levels of acceptable pre-application treatment.

(2) Land acquired after October 17, 1972 that will be an integral part of the treatment or disposal process is grant eligible.

(3) Land acquired after December 26, 1977 that will be used for storage of treated wastewater before land application is grant eligible.

(4) Ponds and other processes necessary to provide minimum levels of pre-application treatment are grant eligible.

(5) Storage, pretreatment, and land treatment processes are 85 percent grant eligible. Also included under this grant eligibility category are certain sludge recycling, energy recovery, and on-site treatment alternatives.

(6) Land salvage value at the end of the planning period equal to the present day value appreciated at a compound rate of three percent annually is allowed.

(7) Reasonable crop recovery factors in the computation of present worth are allowed.

(8) The land treatment system is grant eligible if its present worth is not more than 115 percent of the present worth cost of the most cost-effective alternative.

(9) Should the land treatment project fail to meet design criteria, there is 100 percent grant eligibility for modification or replacement.

As with alternatives I, II, III, and IV, the approximate Sub-basin and Basin-wide costs of the recommended action were calculated using a set of uniformly applied planning assumptions. One of the key assumptions in the economic analysis of the recommended action is that all of the major treatment facilities in each of the 201 facilities plans in the Basin now completed, or currently funded for Step II, will proceed as planned. The analysis utilizes these facilities in staging needs for the years 1980, 1990, and 1995. They are used as integral components of working toward the goal of the recommended action: implementation of land treatment within the Basin by the year 2000 whenever economically competitive and environmentally sound.

In addition to aerated lagoon pre-application treatment, the analysis assumed ten miles of forcemain at peak flow for each facility; ten weeks of storage in lined reservoirs; center pivot spraying with an application rate of 150 acres/MGD; $2500 per acre cost of land; underdrains for one-half of each required site area; monitoring; and fencing. No allowances were included for appreciated land salvage value or crop recovery, although these factors may be credited. These planning parameters used for consideration of land treatment are very conservative. The use of less conservative parameters would make land treatment more cost effective. Those elements of the economic analysis which were used for each of the alternative management strategies (such as cost curves and construction indices) are presented in Chapter IV.

In summary, the point source portion of the recommended strategy is compatible with completed actions and on-going planning, and offers major advantages. It results in better conditions in Lake Jackson than do any of the other alternatives. It appears to be economically competitive. It is consistent with the goals of the Federal Water Pollution Control Act and the Clean Water Act. The recommended action recognizes the site specific nature of land treatment and the need to examine any such alternatives through continuous facilities planning. However, it assumes that each facilities plan will adequately assess land treatment using the most recent state or federal requirements and guidelines.

2. Nonpoint Source Controls

With currently required effluent criteria, approximately 30 percent of the year 2000 phosphorus loading to Lake Jackson is projected to be generated by nonpoint sources. Early in the study, an extensive network of nonpoint source controls in the Upper Ocmulgee Basin, in the form of state and local laws and ordinances, was documented. At the same time it was found that these laws and ordinances were generally not well enforced due to budget and personnel restrictions.

From a review of these nonpoint source control mechanisms now existing in the Basin, it appears that a reasonable (approximately ten percent) reduction of the projected nonpoint phosphorus loading to Lake Jackson would be possible if these mechanisms were better enforced as well as modified to include the best management practice recommendations of the Atlanta Region and Statewide 208 Areawide Water Quality Management Plans. The value of ten percent was arrived at on the basis of adopting the existing Alcovy River Sub-basin phosphorus loadings (pounds per acre per year) as a performance target for the entire Upper Ocmulgee Basin.

D. SPECIFIC ELEMENTS OF THE RECOMMENDED STRATEGY

1. Point Source Controls

In accordance with the most recent Agency regulations and guidelines and demonstrated beneficial impacts to Lake Jackson, each 201 facilities plan in the Upper Ocmulgee Basin will include thorough consideration of land treatment as compared to conventional treatment and discharge to surface waters. Facilities plans in which land treatment alternatives are eliminated with only cursory coverage will be rejected as not fulfilling Agency requirements. On a case-by-case basis, EPA will press vigorously for implementation of land treatment alternatives to reclaim and recycle municipal wastewaters and conserve energy in the Upper Ocmulgee Basin.

Several of the most frequently encountered reasons for inadequate assessment of land treatment alternatives in facilities planning have been:

(1) Overly conservative and, consequently, costly consideration of slow-rate (irrigation) systems.
(2) Failure to consider rapid infiltration as a proven and implementable alternative.
(3) Provision for a substantially higher and more costly level of preapplication treatment than may be required to protect public health and ensure design performance.
(4) Unsubstantiated claims of unavailability or prohibitive cost of suitable land.
(5) Generally negative attitude towards land treatment due to unfamiliarity with latest technologies.

These factors have in the past contributed to the rejection of land treatment alternatives. To ensure adequate and thorough consideration of these alternatives for implementation in the Upper Ocmulgee Basin, each facilities plan should evaluate land treatment using a two-phase approach. The first phase should include sufficient detail to establish whether sites are available, wastewater quality is suitable, and land treatment is cost competitive. The second phase should include in-depth investigation of potential sites and refinement of site specific system design factors. Approval of a facilities plan will be considered only after the following details for evaluation of land treatment are clearly and adequately delineated:

a. Site Selection. A regional map should be included to show all tracts of land evaluated as well as those sites which have potential for land treatment. The narrative discussion of site evaluation should detail the reasons for rejection as well as acceptability of tracts. Slope, soil permeability, depth to groundwater, proximity to drinking water wells, and climate restrictions shall be considered, among other factors.

Any categorical elimination of land treatment for lack of a suitable site during the phase one evaluation should be rigorously documented with support material. Further, any categorical elimination of land treatment should demonstrate that additional engineering required to overcome site constraints would make the alternative more costly than the cost-effectiveness requirements of the law will allow.

b. Loading Rates and Land Area. Overly conservative designs can unduly inflate the cost for technically sound alternatives. Designs should fall within the general ranges given in the EPA Design Manual on Land Treatment (EPA 625/1-77-008). Designs falling outside of these ranges should do so only because of extenuating circumstances peculiar to the site. Such circumstances should be discussed and documented in detail.

c. Estimated Costs. Estimated costs of land treatment alternatives should be comparable to those obtained by using Costs of Wastewater Treatment by Land Application (EPA 430/9-75-003) updated for local construction cost indices. Elimination of land treatment in the cost-effective analysis should be documented by means of an evaluation using the actual cost of land and transport. This evaluation should show clearly that the cost of land or transport does rule out land treatment using an approach similar to that shown in Cost-Effective Comparision of Land Application and Advanced Wastewater Treatment (EPA 430/9-75-016).

d. Pre-Application Treatment. The level of pre-application treatment prior to storage or actual application to the land should be determined in accordance with the guidance given in the EPA Design Manual on Land Treatment. A universal minimum of secondary pre-application treatment will not be accepted. Pre-application criteria should be developed for slow rate, rapid infiltration, and overland flow systems on a site-by-site basis. Treatment criteria more restrictive than the ranges of treatment levels described by latest Agency guidance will be considered unnecessarily stringent unless justified on a case-by-case basis. When the more stringent preapplication treatment criteria cannot be justified, EPA will consider only that portion of the project meeting EPA guidance as eligible for Agency funding. The costs of any additional facilities to meet these more stringent treatment requirements will not be eligible for federal funding.

e. Environmental Effects. The assessment for land treatment alternatives should include emphasis on the quality and quantity of both surface and groundwater resources; on resource reclamation and recycling; on any potential impacts to surrounding land uses; and on the impacts to the spray tract itself.

The assessment should determine the proposed system's consistency with EPA policy on groundwater protection with regard to land treatment systems. This policy is set forth in the criteria for Best Practicable Waste Treatment Technology. The criteria specify that the groundwater resulting from a land treatment system must meet different requirements depending on current use and quality of the existing groundwater. The basic thrust of the criteria is to protect groundwater for drinking water purposes by specifying adherence to appropriate National Drinking Water Standards.

2. Nonpoint Source Controls

Although estimates of present and future nonpoint source loadings were made for the entire Upper Ocmulgee Basin, a detailed investigation of existing nonpoint control mechanisms was made only for the Yellow River Sub-basin. This investigation showed that all local governments within that Sub-basin have adopted some mechanisms having potential for reducing nonpoint source pollution. Of the nineteen jurisdictions investigated, only three had not adopted a soil erosion and sediment control ordinance. However, due to budgetary and/or staff limitations, the many existing ordinances are generally not enforced effectively.

Other management mechanisms currently in use by the jurisdictions within the Yellow River Sub-basin which could reduce nonpoint source pollution include land use planning, flood control ordinances, permit systems, zoning ordinances and subdivision regulations. A tabulation of these mechanisms is shown in Tables V-1 and V-2.

Local jurisdictions in the Upper Ocmulgee River Basin should enforce existing erosion and sediment control ordinances to the maximum extent now possible, and this level of enforcement should be increased as far as practicable as additional funds become available. Those jurisdictions which have not adopted such an ordinance should do so. In addition, all jurisdictions should adopt and enforce as necessary a nonpoint management system incorporating, as appropriate, those mechanisms in Tables V-1 and V-2. Finally, local jurisdictions should adopt the best management practices recommended by the Atlanta Region 208 and the Statewide Areawide 208 Water Quality Management Plan.

TABLE V-1
EXISTING NONPOINT SOURCE MANAGEMENT MECHANISMS; YELLOW RIVER SUB-BASIN

	Water Pollution Program	Water and Sewage Plan	Drainage and Storm Plan	Permit System	Flood Control Ordinance	Land Use Plan	Building Code	Subdivision Regulation	Zoning Ordinances	Soil Conservation Plan	Planning Assistance
DeKalb County	X	X	No	X	X	1976	X	X	X	X	Large In-House professional department
Lithonia	No	No	No	X	No	1962	X	X	X	No	No Planning Commission
Stone Mountain	No	No	No	No	X	1975	X (co)	X	X	No	Utilize County Planning
Gwinnett County	X	X	X	X	X	Update 1976	X	X	X	No	Small In-House Planning Staff
Duluth	No	No	X (co)	No	adopt co. X	adopt co. X	adopt co. X	adopt co. X	adopt co. X	X	Utilize County Planning
Grayson	No	No	X (co)	X	X	1973	X	X	X	X	Non-staffed Planning Commission
Lawrenceville	No	X	Prop	X	X	X	X	X	X	No	Non-staffed Planning Commission; Used Professional Consultants
Lilburn	No	No	No	No	X	X	adopt co. X	X	X	No	No Planning Commission; Used Professional Consultants
Norcross	No	X	No	No	X	No	X	X	X	No	Non-staffed Planning Commission; Used Professional Consultants
Snellville	No	X (co)	X	X	X	X	X	X	X	X	Non-Staffed Planning Commission; Employed a Planning Advisor
Rockdale County	No	Yes	No	Yes	Yes	1975 X	X	Yes	Yes	Yes	County Planning Commission; Used Professional Consultants
Conyers	No	X	No	X	X	X	X	X	X	No	Non-staffed Planning Commission; Utilized County Planning

TABLE V-1 (Continued)
EXISTING NONPOINT SOURCE MANAGEMENT MECHANISMS; YELLOW RIVER SUB-BASIN

	Water Pollution Program	Water and Sewage Plan	Drainage and Storm Plan	Permit System	Flood Control Ordinance	Land Use Plan	Building Code	Subdivision Regulation	Zoning Ordinances	Soil Conservation Plan	Planning Assistance
Newton County	No	X	No	X	No	X	X	X	X	No	Non-staffed Planning Commission; Utilized A.P.D.C.
Covington	No	X	No	X	X	X	X	X	X	No	Non-staffed Planning Commission; Utilized A.P.D.C.
Oxford	No	No	No	X	No	X	X	X	X	No	Non-staffed Planning Commission; Utilized A.P.D.C.
Porterdale	No	X	X	X	X	No	X (co)	X (co)	X (co)	No	No Planning Commission; Utilize County Planning
Walton County	No	X	X	X	X	X	X	X	X	X	Non-staffed Planning Commission; Used A.P.D.C. Assistance
Loganville	No	No	No	X	No	X	X	X	X	Prop	Non-staffed Planning Commission; Used A.P.D.C. Assistance
Walnut Grove	No	No	X	No	No	X (co)	X	X	X (co)	X	No Planning Commission; Utilized County Planning

TABLE V-2
EXISTING MECHANISMS CAPABLE OF AFFECTING WATER QUALITY; YELLOW RIVER SUB-BASIN

	Subsystems Directly Aimed at Controlling Water Quality	Subsystems Indirectly or Potentially Controlling Water Quality
DeKalb County	A, B, D, E, H	G, J, K, L, M
Lithonia	A, D	G
Stone Mountain	B, H	G, K
Gwinnett County	B, C, D, E, I	G, J, K, L
Duluth	B, D, E, I	J, K, L
Grayson	B, D, E	G, K, L
Lawrenceville	B, D, E, I	K, L, M
Lilburn	A, B	G, J, K, L
Norcross	B, E, F, I	G, L
Snellville	B, D, E, I	J, K, L
Rockdale County	Proposed B, C, D, E, F	J, K, L
Conyers	A, C, D, E	G, L, M
Newton County	E, I	K
Covington	B, D, E	G, K, L
Oxford	E	K
Porterdale	B	K
Walton County	B, D, E, I	G, K, L
Loganville	D, E, I	L
Walnut Grove	D, E, I	G, K, L

A) Watershed Protection - linear buffer strips
B) Flood Plain Ordinance
C) Educational Programs
D) On-site water retention for new developments
E) Soil erosion and sedimentation permit
F) Grading permit for grading not covered by Sedimentation Ordinance

G) Highway & Street Regulations (width, street sweeping, grading, curbing)
H) Recycling Requirements
I) Open Space Zoning Requirements
J) Cluster Zoning
K) Power to terminate non-conforming use
L) Density Regulations
M) Planned Unit Devleopments

VI. POTENTIAL ADVERSE IMPACTS AND AVAILABLE MITIGATIVE MEASURES

CHAPTER VI

POTENTIAL ADVERSE IMPACTS AND AVAILABLE MITIGATIVE MEASURES

A. INTRODUCTION

This chapter identifies the potential adverse general impacts associated with the recommended strategy as well as mitigative measures which can be taken to reduce their severity. It is intended only as a summary of the types of adverse impacts sometimes encountered in land application of wastewaters, and of the mitigative measures which are generally available. In the actual implementation of the recommended strategy, unavoidable adverse impacts will be assessed and mitigative measures recommended on a case-by-case, site-specific basis.

B. POTENTIAL ADVERSE IMPACTS

1. Soils

Soil conditions, including drainage characteristics and levels of chemical constituents, may be affected by land application. Infiltration and percolation capabilities of soils may decrease as a result of clogging by suspended solids contained in the applied effluent. Long-term effects on soil chemistry from the accumulation of certain constituents, such as heavy metals, may reduce crop yield or adversely impact the usability of crops.

2. Groundwater

Wastewater constituents which are not utilized by plants or crops on the site, not degraded by micro-organisms in the soil, or not fixed in the soil matrix, may leach into the groundwater. Nitrate nitrogen is always of concern. However, other constituents such as heavy metals, total dissolved solids, organic compounds and pathogens may be critical depending on the individual project.

3. Surface Water

When used to replace effluent disposal systems previously discharging to surface waters, land application systems can result in decreased stream flow. This impact would be most noticeable during periods of extreme drought, when adverse impacts to downstream water supplies could result.

Improperly designed land application systems can adversely impact surface water by intercepting the water course through soil or rock or, more directly, by off-site surface runoff of applied effluent.

4. Fauna and Flora

Displacement of wildlife and destruction of habitat are the chief impacts to wildlife associated with construction and operation of land application facilities. Natural or existing cover types may be destroyed by construction of land application facilities, depending on the chosen system.

5. Aerosols

Improperly treated and/or applied effluents may pose some risks to nearby residents in the form of bacterial or viral presence in aerosols. Aerosols may be spread by wind or by animal vectors (carriers).

6. Climate

Possible microclimatic impacts at or near the land application site -- particularly a large spray irrigation or overland flow facility -- include increased fog and humidity, decreased temperatures, and nuisance odors.

7. Socio-Economic

Relocation of residents, potential changes in the value of land at or adjacent to the site, and loss of tax revenue as a result of government purchase of land are the chief potential socio-economic impacts of land application.

C. AVAILABLE MITIGATIVE MEASURES

1. Soils

Careful site selection, exercise of proper management techniques and application of properly treated effluents are the principal measures available to ensure proper drainage and minimize chemical build-up in the soil matrix. Proper siting includes careful analysis of physical and chemical soil characteristics to ensure adequate permeability and chemical compatibility. Good system planning includes provision of proper application rates, adequate periodic drying times, and suitable cropping. Other management techniques include rotational application whereby application is rotated among tracts on the site to permit the other tracts to "rest", and soil raking to help reduce clogging by suspended solids.

Proper design can predict the impacts of dissolved or suspended constituents on the soil matrix initially, and thus permit requirements to be defined for monitoring the rate of change of the anticipated chemical composition of the soils. Strict enforcement of pretreatment ordinances will reduce, if not completely eliminate, the entry of toxic chemicals or other incompatible constituents into municipal sewerage systems employing land application. In addition, monitoring the wastewater prior to land application will help to identify constituents which can cause adverse impacts to the soil matrix and to crops being grown on the site.

2. Groundwater

Careful site selection is one of the most important ways to minimize potential impacts to groundwater from land application systems. Soils which provide adequate but not excessive permeability should be used. Local geology must be considered. For example, porosity, folding, jointing, and faulting must be taken into account. Local groundwater conditions, including seasonal depths to saturated zones, must be known.

The use of careful crop selection and management is another way to minimize potential groundwater impacts. Crops which grow well in the area, maximize nitrogen uptake, and can be sold easily should be used. Crops need to be harvested at optimum times and removed from the land application site.

As in the case of mitigative measures to protect soils, proper design is critical to minimizing adverse impacts to groundwater. Prudent application rates, provision of adequate on-site storage (including lining where necessary), and proper calculation of nitrogen balances for critical periods are important. In addition, strict enforcement of pretreatment ordinances and establishment of a groundwater monitoring program should be included in the overall management of the system.

3. Surface Water

Measures available to mitigate impact to downstream water supplies as a result of decreased stream flow during drought conditions include increasing "in-system" water storage, providing adequate water system interconnections, and creating contingency plans for water system management during emergency conditions.

Measures available to mitigate potential adverse impacts to surface water quality include, once again, careful siting, and proper design and management. Provision of adequate on-site drainage, use of proper application rates, provision of contingency plans for emergency conditions, cessation of application during periods of high rainfall, and proper utilization of storage facilities are necessary procedures.

4. Fauna and Flora

The degree of wildlife displacement and destruction of habitat will vary according to the method of application chosen. For example, overland flow generally results in less site disturbance than does spray irrigation. However, should it be found necessary to clear forested land, or otherwise alter the existing cover type, there is little that can be done to mitigate associated impacts to wildlife. In any case, siting and/or design should be carried out in a manner which will protect threatened or endangered species of plants and animals in the area.

One other feature of land application systems which is sometimes overlooked, but which can perhaps be regarded as a mitigative measure to impacting flora and fauna, is the fact that land application facilities preclude any development on the site for at least the life of the project. Large tracts of land are effectively put into a "land bank" for long periods of time. Local government options exist for the creation of future parks and open-space land or the restoration of natural areas.

5. Aerosols

Measures available to mitigate potential adverse impacts from aerosols include provision of an adequate, but not excessive, level of treatment, creation of buffer zones around the application site, cessation of operations during periods of high winds, and use of low pressure, large droplet sprinklers, or other state-of-the-art application devices.

6. Climate

Microclimatic impacts, if any, are likely to be minimal and extremely localized. Increased fog and humidity, and decreased temperatures may be mitigated to some extent by regulating routine spraying operations, and by not spraying during adverse climatic conditions. Nuisance odors may be controlled by good operation and management techniques such as proper spraying rates and adequate maintenance of pretreatment and storage facilities.

7. Socio-Economic

Careful siting can minimize or eliminate the requirement for relocation of residents. However, any necessary relocation and/or eminent domain proceedings should be done in accordance with the Uniform Regulation Land Acquisition Policies (URLAP) Act of 1970. Decreases in property values -- real or imagined -- can be mitigated by siting the facility in areas of compatible present and future land use and zoning. In addition, attractive facility design and proper operation will contribute to rendering the facility a good neighbor. Finally, loss of tax revenue can be minimized by siting in an area of low taxes at the outset. This would likely be an advantage associated with siting in an area of compatible land use and zoning in any case.

D. SUMMARY

Mitigative measures for potential adverse impacts associated with land application of wastewater are inherent in the proper siting, design, and management of each facility. Extensive federal, state and local guidelines exist and should be applied on a site-specific basis.

APPENDIX I

Citizen Participation

On November 11, 1976, a public meeting was held to present the study approach for the preparation of an Environmental Impact Statement for the Upper Ocmulgee River Basin. Listed below are members of the EIS teams which were introduced at that time.

The Environmental Group:	Coastal Zone Resources Corporation
	James H. Hudgens (Water Quality Specialist)
The Planning Group:	Stottler Stagg & Associates
	Roy F. Cowell (Environmental Planner)
	E. Larry Fonts (Environmental Planner)
The Engineering Group:	Stottler Stagg & Associates
	Eugene J. Kazmierczak (Environmental Engineer)
The Computer Modeling Group:	GKY & Associates
	G. Kenneth Young (Environmental Engineer)
The Management System Group:	Public Research & Management, Inc.
	Robert Stuebing (Planner/Economist)

The Environmental Protection Agency

John Hagan	Chief, EIS Branch
Robert Howard	Chief, EIS Preparation Section
Richard Green	Project Officer (12/75 - 8/79)
Bowman Crum	Project Officer (10/79 - publication)
John Marlar	Chief, Technical Support Branch
James Kutzman	Chief, Applied Technology Section

Georgia Environmental Protection Division and the Atlanta Regional Commission

A memorandum of understanding between EPA and the Georgia EPD and Atlanta Regional Commission regarding coordination of effort on this EIS was executed in November 1976.

Harold Reheis	Chief Water Quality Control Section, Georgia EPD
Thomas Leslie	Environmental Engineer, Atlanta Regional Commission

CITIZENS ADVISORY COMMITTEE
FOR THE
UPPER OCMULGEE RIVER BASIN EIS

AGENCY	MEMBER
Yellow River Action Committee	Ed Anderson
Coalition for Pollution Control (Lake Jackson Civic Association)	Ray Merritt
Audubon Society, Atlanta Chapter	Elmer Butler
The Sierra Club	Roger Buerki
Gwinnett County League of Woman Voters	Nancy Leathers
Georgia Department of Natural Resources - Environmental Protection Division	Roy Herwig
DeKalb County Commission	Jeff Hudgins
Gwinnett County Commission	Lloyd N. Harris
Rockdale County Commission	Elaine Nash
Newton County Commission	Roy Varner
Atlanta Regional Commission	Thomas Leslie
McIntosh Trail Area Planning and Development Commission	Ed Evans
Covington-Newton Chamber of Commerce	Art Cassella
Conyers-Rockdale Chamber of Commerce	Raymond Davis
Metro Atlanta Home Builders Association	J.D. Caswell
DeKalb Developers Association	James Kelly
Upper Ocmulgee River Soil & Water Conservation District	Carvis P. Williams

A number of meetings were held with the Citizens Advisory Committee to keep it abreast of the work being completed on the preparation of this Environmental Impact Statement. Summarized below are the dates and the substance of those meetings.

January 13, 1977 - Conyers City Hall - A discussion of the work program, the anticipated schedule of completion of various tasks, the CAC's role, and a status report of work completed to date was held.

April 6, 1977 - Gwinnett County Historical Society Female Seminary - This meeting focused on the EIS draft report of Chapters I and II.

September 19, 1977 - Redan High School, Stone Mountain, Georgia-at this meeting the proposed scenarios for the construction of Water Quality Alternatives were discussed. Two Task Reports, "Development of Scenarios for Water Quality Management, Yellow River Sub-basin, Upper Ocmulgee EIS" and "Scenario Inputs Population and Flow Data, Yellow River Sub-basin, Upper Ocmulgee EIS", were presented.

December 14, 1977 - Stone Mountain City Hall - This meeting discussed the proposed wastewater management alternatives for the Yellow River Sub-basin. The Task Report, "Summary of Proposed Water Quality Management Alternatives - Yellow River Sub-basin - Existing and Year 2000 Conditions," was presented.

January 24, 1977 - Stone Mountain City Hall - A discussion of the Task Report, "Summary of Primary and Secondary Impacts of Alternative Water Quality Management Systems - Yellow River Sub-basin," took place. Also presented to the CAC members was a schedule for remaining project tasks.

June 19, 1978 - Stone Mountain City Hall - This meeting was held to discuss the proposed methodology for development and assessment of management strategies. Also presented was a sample matrix of management subsystems which were used in evaluating the management strategies.

May 8, 1979 - Environmental Protection Agency's Regional Headquarters - A twenty-eight minute color videotape presentation describing the objectives of this EIS and the development and evaluation of alternative management strategies for the Upper Ocmulgee River Basin highlighted this meeting.

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